I.T.R.

THE IRON TRADE REVIEW

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Competition for Contracts

With considerable cutting of prices of finished materials —Corporation tonnage report favorable

Various attempts to show that the Steel Corporation's showing of unfilled orders for February, indicating a gain of 412,760 tons, was not as favorable as it appears, are not well founded. Shipments were heavy in spite of somewhat unfavorable weather, bookings averaged more than 50,000 tons daily and the report is very encouraging. Other developments in the market have not been so favorable. New business and specifications on contracts for finished materials have declined and some very low prices are being made, especially on structural material. Some contracts being taken by fabricators and erectors indicate that the plain material is being figured on an extremely low basis. In spite of efforts of leading companies to advance quotations on shapes, plates and bars to 1.25c for March and 1.30c for the second quarter, business is being done at 1.20c, and this is probably shaded in some cases. Five additional furnaces are being blown in this week by the Steel Corporation and one at Sharon is being blown out. The Corporation is now operating 75 per cent of its blast furnace capacity and 80 per cent of its ingot capacity.

Iron Ore

The 50,000,000-ton record for shipment of Lake Superior iron ores, which has been talked of for years, would have been attained last year if 52,884 tons more, about five boat loads, had been shipped. Statistics just compiled by THE IRON TRADE REVIEW show that the shipments for 1913 amounted to 49,947,116 tons, a gain of 1,725,570 tons compared with the previous record, which was made in 1912. The all-rail shipments in 1913 were 876,638 tons and the movement by lake was 49,070,478. Independent ore mining companies made an excellent showing, as they shipped 50.94 per cent, although the Steel Corporation shipped a greater tonnage than ever before.

Pig Iron

Pronounced dullness continues to characterize the pig iron market, but prices, as a rule, are being firmly adhered to by furnaces. It remains to be determined whether present prices will prevail for last half. The Dominion Iron & Steel Co., which recently sold some 25,000 tons of pig iron for delivery in the east, has withdrawn as a seller, but may return to the market later. The appearance of the Canadian company as a seller in this country has caused considerable anxiety among eastern furnace operators. The price at which Indian iron is being quoted for delivery in this country, $17.50, is too high by several dollars to make is a competitor of American iron.

Plates and Shapes

A decided revival in the placing of structural contracts has taken place in western territory and there is a fair amount of contracting in other sections, but low prices are being made on fabricating and erecting. The great railroad bridge over the Mississippi, at Memphis, will require 16,000 tons of steel for the bridge proper, which will be erected by the Pennsylvania Steel Co. Mayari chrome-nickel steel will be used. The bridge approaches, requiring 4,500 tons of steel, will be erected by the Virginia Bridge & Iron Works. The Great Northern office building in St. Paul, 8,000 to 9,000 tons, has been awarded to the Cambria Steel Co. The Worth Bros. Co. and the Central Iron & Steel Co. have been awarded 3,000 to 4,000 tons of plates and Pittsburgh makers about 1,000 tons of shapes for barges to be built in government navy yards.

THE OPEN HEARTH

Inequalities of the Income Tax

AT last, after years of contention, discussion and wrangling and much political bitterness, the people of the United States are—a few of them—compelled to pay a federal income tax.

While it has been generally foreseen that the tendency has been in this direction, and opposition to the proposition has been intense from some directions, yet those who were to pay have had little to say about it.

It was theirs to pay the tax—"taxation of the few for the benefit of the many". This is so for the reason that it is conceded that the tax as levied will call for payment from a good deal less than 10 per cent of the population and our legislators at Washington know the value of pleasing nine men and running the risk of displeasing one.

But as a matter of simple justice it has not been opposition to the tax itself always, but opposition, in the first place, to the exemption clause that permitted the man, if married, to escape if his income was $4,000 or less, and the single man, if his income was $3,000 or less.

There has been a feeling that it would have worked no hardship had those figures been cut in two, thereby adding to the sense of responsibility of a good many hundreds of thousands of our citizens.

And there are those who think that a sense of responsibility in that direction might be a pretty good thing.

Then again there has been some feeling that the men of extra large income had to submit to an unjustly large assessment.

Both are differentiations that are certainly contrary to the spirit of equality and "equal rights" that we have preached so much about.

Aside from this, however, and in spite of much talk to the contrary, those citizens who are really taxable are likely to meet the issue like men, and there is no great reason to believe that there will be as much tax-dodging on incomes as there has been upon personal taxes.

The income is more definite and easily determined and there exists less desire to conceal than where personal property is the issue.

Besides this, "four-thousand-dollar" men are apt (as a general thing) to be real men and the exception will only prove the rule.

They Do It Differently

WHILE THE IRON TRADE REVIEW is without positive conviction concerning the general efficiency and advantage to the country of the much talked-about, much written-about German Syndicate System, it is interested in noting that the syndicates seem to grow and prosper and apparently are blessed with a large share of governmental favor.

And as no one has yet been able to prove that our German friends were unbusiness-like or unscientific in their methods of governing and encouraging their business interests at home or abroad, is it not possible that we may yet be able to learn something from Germany in this respect?

It is notorious that the most perfect systems (from the German standpoint) entirely control the output of all syndicated articles, as to production, sale, and price.

There were at the time of the last report we have seen, 80 syndicates alone in the iron and steel industry, but while even the most far-sighted and best-managed of these cannot absolutely control the markets, yet they are successful in relieving the extreme conditions in which the markets there (as well as here) sometimes find themselves.

It is claimed (and apparently the claim is not severely contested) that price maintenance operates advantageously to the consumer both at home and abroad, in insuring him against extreme loss when he has put in a large stock and prices recede, and also against the extremely high prices that might occur and run up the market when the buyers all want to contract for long periods in advance.

In America, while there can be no likelihood that the German method will be adopted, signs are not wanting that manufacturers are coming closer together and exchanging confidences as to costs and selling prices. The result will probably insure a greater measure of stability which will be an improvement over the condi-

THE OPEN HEARTH

tion of bitter competition, which has so long existed to the injury of all and the advantage of no one.

Getting Down to Business

THERE is a growing impression that the Interstate Commerce Commission will not hand down a decision on the request for a general advance on freight rates desired by the eastern lines, until it clears the docket of all the complicating and entangling issues that have been submitted to it covering freight rates on all sorts of subjects and all sorts of materials from all parts of the country.

On Jan. 27, the Interstate Commerce Commission notified the operators of Industrial railroads that in its judgment they should cease the division of freights with the railroads over which they were receiving service.

On Feb. 21, the Commission decided the long-drawn-out and severely contested, famous "Valleys Coal Case", adversely to the Mahoning and Shenango Valley iron and steel manufacturers, re-affirming the 70c rate on coal from Pittsburgh and refusing the reduction asked by the manufacturers.

On March 1, the Commission decided that industrial railroads were not entitled to charge demurrage to private customers who in the eyes of the Commission were not bona fide railroads and were not entitled to this right.

These decisions have been rendered and there are others to follow.

This is as it should be. All of the issues that have either a direct or indirect bearing upon the main contention should be cleared up and out of the way before the greater subject is decided.

The railroads are setting their house in order. They are taking advantage of every possibility in adding to their revenues, following advice of the Commission, and will endeavor to gain income by all suggested means, thus perhaps bringing about an increase in earnings equal to that expected from the proposed rate addition. In any event it seems the matter is being pretty thoroughly stirred to the bottom and every phase is coming into the limelight, where it can be viewed, valued and weighed with care. Perhaps in the final analysis both roads and shippers will find their positions bettered by an adjustment fairer to all and really harmful to none.

Does Not Know It All

THE head of the Bureau of Corporations, Joseph E. Davies, is going at this trust question, apparently, in a little different way than some men who have held public office.

With a "know-it-all-you-can't-tell-me-anything" manner, they have assumed always that combinations and associations of all kinds were detrimental to public interests, but these officials possessed, more than likely, no practical personal knowledge other than that gained from the reading of speeches of the men anxious for the applause of the multitude or the extraordinarily exaggerated utterances in the columns of the daily papers.

Our public men have invariably chosen the attitude that appeared for the moment to be popular and have bid for public favor by attacking anything and everything that represented large and important interests upon the slightest pretext.

Mr. Davies, though, appears anxious to do a little quiet investigating of his own and proposes to find out the facts first and consider the remedy later.

In a recent utterance he has said:

"The question is whether the trust form of organization is really efficient. If it be found that smaller competitive units in industry can produce commodities more cheaply, or even as cheaply, as monopolistic units, and that they have other and greater advantages than those claimed for the monopolistic or trust system, then the problem is finally settled in favor of the competitive system, and the chief argument for the regulation of monopoly is destroyed. This is a scientific question of fact, and it is the plan of the bureau to investigate this question."

The country will await with interest the result of the sanest expression of thought upon this subject coming from a public man in a long time.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for March, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Feb., 1914.	Average for Dec., 1913.	Average for March, 1913.
Bessemer pig iron, Pittsburgh..	$15.15	$15.09	$15.90	$18.15
Basic pig iron, Pittsburgh.....	13.90	14.09	13.71	17.03
No. 2 Fdy. pig iron, Pittsburgh	14.15	14.09	14.36	17.65
Northern No. 2 fdy. Chicago...	14.25	14.25	14.50	17.50
Ferro manganese, Baltimore....	38.00	38.75	46.50	64.25
Lake Superior char., Chicago..	15.50	15.50	15.50	18.00
Southern No. 2, Birmingham...	10.75	10.75	10.75	13.00
Southern Ohio No. 2, Ironton..	13.50	13.00	13.50	16.00
Basic, eastern Pa.....	14.25	14.15	14.00	17.50
No. 2X Virginia furnace.....	12.75	12.75	12.75	15.50
No. 2X Foundry, Philadelphia.	15.00	14.75	15.00	17.75
Bessemer billets, Pbgh. and Ygn.	21.00	21.00	20.00	29.00
Open hearth billets, Pbgh. & Yn.	21.00	20.75	20.00	29.50
Bess. sheet bars, Pbgh. and Yn.	22.00	22.00	21.00	29.50
Op. h'th sh. bars, Pbgh. & Yn.	22.00	21.75	21.00	30.00
Steel bars, Pittsburgh.....	1.20	1.20	1.21	1.40
Iron bars, Philadelphia.....	1.27½	1.27½	1.27½	1.67½
Iron bars, Cleveland.....	1.25	1.25	1.30	1.65

	Today's prices.	Average for Feb., 1914.	Average for Dec., 1913.	Average for March, 1913.
Iron bars, Chicago mill.....	1.20	1.20	1.15	1.60
Beams, Pittsburgh	$ 1.20	$ 1.20	$ 1.25	$ 1.45
Tank plates, Pittsburgh.....	1.20	1.20	1.18	1.45
Sheets, blk., No. 28, Pittsburgh	1.90	1.94	1.88	2.35
Sheets, blue ann., No. 10, Pitts.	1.40	1.40	1.40	1.75
Sheets, galv., No. 28, Pitts....	2.95	2.94	2.87	3.50
Wire nails, Pittsburgh.....	1.60	1.59	1.55	1.75
Connellsville fur. coke, contr...	2.00	1.92	1.81	2.50
Connellsville fdy. coke, contr...	2.50	2.50	2.54	3.50
Heavy melting steel, Pittsburgh	12.25	12.37	11.00	14.25
Heavy melting steel, eastern Pa.	12.00	11.00	10.00	13.50
Heavy melting steel, Chicago...	10.50	10.50	9.00	12.50
Heavy cast, eastern Pa.....	13.00	13.00	12.50	14.00
No. 1 wrought, eastern Pa.....	14.50	14.50	13.00	15.50
No. 1 wrought, Chicago.....	9.75	9.85	8.50	12.00
Rerolling rails, Chicago.....	11.75	11.00	11.50	15.00
Car wheels, Chicago.....	12.25	12.25	11.75	17.25

(For Additional Prices See Page 528.)

Pittsburgh Market Drags

Considerable irregularity in prices of finished materials—Basic pig weaker

Office of The Iron Trade Review,
2148-49 Oliver Bldg.,
Pittsburgh, March 10.

Continued inclement weather has contributed largely toward minimizing steel trade activity throughout the most thickly populated sections of the country, and the general situation is not regarded so favorably as it was a month ago. Price irregularity still features the market, and manufacturers of plates, shapes and bars have practically abandoned the hope of establishing the 1.30c level for second quarter. No change in conditions is expected until the latter part of the month, when, it is hoped, outdoor work will be in full swing. Specifications have fallen off slightly, but mill operations are unchanged. Rolling mills are operating from about 60 to 90 per cent of capacity, but steel foundries, taking the country as a whole, are not producing more than 50 per cent of capacity, it is estimated by some. The unfilled order report of the Corporation, issued today, is more favorable than expected. Pipe, wire, sheet and tin plate manufacturers continue to receive liberal specification.

Pig Iron

Pig iron consumers, particularly those using steel-making grades, have decreased melts in many instances, and shipments are not being urged as they were three weeks ago. Basic is being held at $13.25, valley, but it can be obtained at less than $14, delivered, Pittsburgh, recent transactions indicate. It is not surprising, however, that this grade should show slight weakness, considering the rapid advances in February. Other grades are quiet, and unchanged.

Ferro-Alloys

With practically all ferro-manganese consumers under cover for the year, the market is quiet, and there is no change in the price situation, although dealers are offering material more cautiously.

Sheets and Tin Plate

Steel sheet manufacturers have taken a number of attractive orders from car builders, and demand from automobile builders has been more satisfactory. Some price irregularity, believed to be the result of unfavorable weather conditions, is noted. Sheet and tin plate mills are operating at almost full capacity.

Plates and Shapes

Early in February, makers hoped to establish prices on a 1.30c basis before July 1; at present they are struggling to eliminate quotations below 1.25c, but have thus far been unsuccessful. And talk of 1.15c being done on plates in the west still is heard. New buying is light, and specifications, in many instances, have fallen off.

Rails and Track Material

Specifications for standard and light steel rails have improved to some extent, but heaviest consumers continue to postpone covering requirements for the year. Standard spikes continue low, and the price is not sufficiently attractive to interest some makers.

Semi-Finished

There is no actual change in the market, although expressions are heard that Pittsburgh consumers would have to pay $1 a ton above prevailing prices to obtain billets and sheet bars. Muck bar and wire rods are unchanged.

Bolts, Nuts and Rivets

Specifications have come out in better volume, and less price irregularity is reported. Discounts on nuts and bolts are not yet established on definite levels.

Bars, Hoops, Bands and Shafting

New demand for iron and steel bars has not been so heavy, but specifications have not fallen off to any great extent. Steel bars are quotable at 1.20c to 1.25c. Hoops, bands and shafting are unchanged.

Tubular Goods

Iron and steel pipe makers continue to receive a fair volume of new business, and mills are operating at satisfactory rates. Activity in the oil and gas fields this year will exceed that of last, according to present

(*For Complete Prices See Page 528*)

estimates. Boiler tubes are not so strong as standard pipe.

Wire Products

Woven wire fencing has been advanced ½ point, or about 80 cents a ton; copper wire has been reduced about 45 cents, but prices of wire nails, plain wire, etc., are unchanged, although talk of a proposed advance is heard. Specifications continue liberal, but no new buying is expected until spring.

Coke

It is understood that another eastern consumer has bought a fairly heavy tonnage of furnace coke for March shipment, and a valley consumer has taken about 8,000 tons, at $2, ovens. Congested traffic conditions failed to strengthen coke prices, although demand has increased sufficiently since Feb. 1 to warrant the blowing in of additional ovens. The Connellsville Courier for the week ending Feb. 28, says production was 313,870 tons, an increase of 3,710 tons compared with the week before.

Old Material

Except for sales and trades between dealers the market is quiet, and prices are somewhat lower than a week ago. Heavy melting is being held at $12.50, but that figure is being shaded 25 cents a ton.

No Interest in Scrap.

Consumers are not interested in the scrap market and dealers are not anxious to offer tonnages under the circumstances. The result is absolute lethargy, which is added to by continuous offerings by the railroads. The Mobile & Ohio offers 1,200 tons, the Santa Fe, 4,000 tons, of which 700 tons are No. 1 railroad wrought, 200 tons No. 2 railroad wrought and 200 tons No. 2 cast. The C. St. P., M. & O. offers 700 tons, of which 130 tons are long steel rails.

Structural Contracts

A feature of the finished steel market of the past week has been the unusually large number of structural contracts closed, which is to be expected at this season. They are for a variety of enterprises and widely scattered, for the most part small tonnages, with a few running into large business.

Chicago Mills Less Active

Reduction marked in some cases—Sale of malleable to Illinois company

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, March 10.

The largest tonnage of pig iron sold this week in this market was 4,000 tons of malleable to the Illinois Malleable Co. This is believed to have gone at $14.25, delivered, which is equivalent to $13.75, Chicago furnace. The iron was sold by the Thomas Furnace Co., Milwaukee.

Pig iron producers uniformly find conditions quieter than since the first of the year. The premium asked for second half iron has effectually stopped inquiry for that period and business at present is confined to making deliveries on previous contracts and caring for the usual run of small prompt orders for carloads.

The price for No. 2 foundry and malleable remains $14.25, for delivery up to July 1.

Thomas Furnace Bloks In.

The Thomas Furnace Co., Milwaukee, put its stack in blast last week, after being out since July. This interest has been an active competitor in the market and is believed to have sufficient tonnage to warrant operations.

Steel Gained in February

After February equaling or exceeding January in specifications for finished steel products, mills in the Chicago district are starting the last lap of the first quarter with somewhat less activity evident. One interest finds its February business exceeded January nearly 25 per cent, but the first week of March is comparatively lighter than the average of January and February. However, if the present rate prevails for all of March, the first quarter will close with an unexpectedly large total.

Some other interests have found their business not so encouraging as the instance mentioned and the slackening evident this month is marked in some cases. A leading interest reports the first week in March the most active in finished steel products since the first of the year.

Bar Iron May Advance

Activity in the bar iron market is such that an advance from 1.20c to 1.22½c is planned by some makers. However, as 1.17½c has not absolutely disappeared from the market, the advance may not be announced.

While bars, plates and shapes are quoted at 1.38c to 1.43c, one important interest continues quoting the minimum, which indicates the market has not gained strength recently.

Some Cast Pipe Moving

Awards of over 6,000 tons of cast iron pipe were made last week to the leading interest as follows: Akron, O., 3,000 tons; Hibbing, Minn., 600 tons; Ft. Wayne, Ind., 300 tons, and with small orders for gas pipe aggregating 2,500 tons, all in the west. Edmonton, Alta., will open bids March 12 on 3,700 tons, on which makers in this country will bid, without very much hope of obtaining the business, in view of the duty levied on pipe imported into the dominion. Detroit will open bids for 10,500 tons and Council Bluffs, Ia., on 500 tons this week.

(For Complete Prices See Page 528)

Fleet Chartered

By Bethlehem Steel Co. to Carry Chilean ore

By contract just closed, the Bethlehem Steel Co. has arranged to charter from Swedish transportation interests a fleet of five steel steamships of 17,000 tons cargo capacity each, to carry iron ore from the company's Chilean holdings to Philadelphia or New York harbor. These charters are to run for a period of 10 to 20 years and have been closed at a fixed freight rate of 11s 6d, or $2.80 per gross ton. The vessels are to be designed and built especially for ore carrying and will be ready to enter upon the contract in two years. The construction of these vessels will be done in England.

The closing of this important transportation contract insures the Bethlehem Steel Co. a large base of rich ore supply over a period of years. The Chilean deposits, known as the Tofo iron mines, not far from Coquimbo and close by the bay of Cruz Grande, which were acquired more than a year ago by the Bethlehem Steel Co., are understood to be of great magnitude and to consist of a hard hematite ore, averaging better than 60 per cent. Assuming that this ore will maintain a 62 per cent average in the natural state, eastern ore men state that the transportation arrangements now concluded will insure the Bethlehem Steel Co. a cost of 7¼ cents, possibly less, per unit of iron, delivered at South Bethlehem.

Weakness in Cleveland

In finished material prices—Pig iron dull but prices firm

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, March 10.

Pronounced weakness in some finished materials, particularly sheets and shapes, has characterized the Cleveland market during the past few days. Bidding on the O'Neill & Kresge building, at Akron, calling for about 450 tons of shapes, developed some extremely low prices and it is evident 1.20c, Pittsburgh, was shaded by some bidders. Likewise in sheets low prices have developed and it is believed that 1.85c, Pittsburgh, on No. 28 black has been shaded. The sheet market is extremely dull. The 500 tons of steel for the cylinders or caissons of the Lincoln Memorial, Washington, which it was reported last week had been awarded to a Cleveland company, have been placed with the Pennsylvania Steel Co. One of the large contracts that are interesting Cleveland buyers is that for the dock and coal handling plant at Charleston, S. C., soon to be awarded by the Holston Corporation. About 1,000 tons of bars, 1,000 tons of beams and a considerable tonnage of other materials will be required, but material for car dumpers only is pending at present. The entire cost of the project will be about $2,000,000. The J. W. Frazier Co., Illuminating building, is drawing the plans. The Central high school, Washington, to be erected by Wm. Dall, Cleveland, will cost about $1,200,000.

The filtration plant to be built by the city of Cleveland will require from 2,000 to 3,000 tons of reinforcing bars. It is expected that the contract will be awarded in about 60 days.

There is a fair demand for reinforcing bars, but concessions are being rather freely made by the mills, especially in dropping charges for extras. The wire business is active and while it is believed in some quarters that an advance in price would be justified, it is doubtful whether any advance will be announced in the near future. Failure of leading companies to maintain advances on plates, shapes and bars has served as a warning to other companies not to advance prices too rapidly.

Iron Ore

The movement of ore from Lake Erie docks to furnaces has been light owing mainly to weather conditions, but the amount on dock March 1 was not as great as it was for the corresponding date last year. On March 1, the docks held about 7,740,000 tons. It is expected that the docks will bear about the normal amount on May 1. Meanwhile the market is very quiet and the subject of ore sales for 1914 delivery has not yet been taken up.

Pig Iron

The pig iron market continues to be extremely dull, but prices are firmly maintained and both sellers and buyers are viewing present conditions rather complacently.

Coke

There has been very little buying of furnace coke by Cleveland interests except a few carloads at a time for prompt delivery and on such transactions $2 has been the ruling price.

Old Materials

Except for trading among dealers who are covering up short sales, the scrap market is almost absolutely inactive. Both steel mills and rolling mills do not care to take on scrap at any price. With the snow off the ground and supplies coming in which have been tied up for some time, it is difficult to estimate where the prices may go; in some quarters talk may be heard of a return to the November record low level. Prices are largely nominal at present.

Cincinnati Prices Higher

But extreme quiet continues—Some shading reported in the south

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, March 10.

Southern Ohio pig iron makers continue to advance quotations despite the fact that the market is as quiet as at any time since the first of the year. The Marting Iron & Steel Co., Ironton, O., is now asking $13.50, Ironton basis, for No. 2 foundry iron for the second quarter, and $14, Ironton, for the second half. As this is the same level to which the Wellston Steel & Iron Co., Wellston, O., and the Hanging Rock Iron Co., Hanging Rock, O., advanced several days ago, the minimum quotation for this iron is now $13.50, Ironton, since these three producers are the only ones in blast in the Ironton district at the present time. Very few sales, however, are reported at this figure, as dealers are not inclined to pay more than $13, Ironton, for the second quarter, and furnaces are not anxious to book second half business except at good prices.

A few southern producers and dealers are rumored to have secretly juggled the market and sold No. 2 foundry iron below $10.75, Birmingham basis, for prompt shipment within the past week, but such reports cannot be verified. It is known, though, that $10.75, Birmingham basis, can be done on furnace iron for the second quarter.

The majority of furnaces are on an $11, Birmingham basis, for the rest of this half, and a few are asking $11.50, Birmingham basis, for second quarter. Most of the warrant iron selling below $10.75, Birmingham basis, such as that of the Dayton Coal & Iron Co., Dayton, Tenn., is being offered at a lower figure for delivery east of the Ohio-Indiana state line only.

The Indianapolis Foundry Co., Indianapolis, will close for from 1,500 to 3,000 tons of northern foundry iron either today or tomorrow.

Finished Materials

The recent bad weather has handicapped warehouse business to a slight extent and dealers, looking for an improvement with the beginning of spring, are commencing to add to their stocks. Prices are unchanged but there are rumors of cutting by one local house. A general change in quotations is expected before the end of the present month.

Sheets continue to be the strong factor in the finished material market, and makers in this territory report good orders for both spot and future shipment. Billets are quiet, but strong at $22.20, Cincinnati, and wire rods are holding at the recent advance to $28.20, Cincinnati. Sheared plates are quoted at 1.40c, Cincinnati, and sheets as follows: Blue annealed, No. 10, 1.60c to 1.65c,; galvanized No. 28, 3.15c to 3.20c, and black No. 28, 2.15c to 2.20c.

The principal factor confronting dealers at the present time is the congested condition of railroads, and the delay of forwarding shipments.

(*For Complete Prices See Page* 528)

Orders in East Are Light

Specifications and new business show decrease —Pig iron quiet

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, March 10.

Eastern steel mills are keeping up operations of from 65 to 80 per cent though specifications on old orders and also new business are smaller. Makers hope they will catch a new buying movement before present order books are depleted. The Alan Wood Iron & Steel Co. is blowing in the first of its idle blast furnaces. The Maryland Steel Co. last week started two blast furnaces and this week its rail mill resumed, with orders for about a month ahead. Pig iron is quieter; old material duller and weaker.

Pig Iron

The Dominion Iron & Steel Co., which recently sold a considerable tonnage of its Wabana, Nova Scotia, iron in this district, has withdrawn as a seller. This withdrawal, it is said, is due largely to a shortage of boats arriving from the fact that the company sustained some loss of vessels in recent storms, and probably will only be temporary. The first cargo of this iron will leave Sydney, March 20, and will reach Philadelphia about March 25. While eastern makers state they appreciate the iron, because of its high phosphorus character, will not directly compete with standard brands, they anticipate that its offering will be a very disturbing factor and will tend to hold down prices. The local market is extremely quiet. Small sales are fair but larger transactions are lacking. The Baldwin Locomotive Works, which recently asked for several thousand tons, has deferred action. Some of the cast iron pipe makers tentatively are in the market and would take round tonnages at satisfactory prices. The Southern railroad, inquiring for 1,300 tons, has placed 800 tons of foundry with southern makers for first half. Eastern Pennsylvania No. 2X continues at $15 to $15.15, Philadelphia, but the inside figure can be shaded with some makers. Some Virginia makers now will accept $12.75, furnace, for No. 2X for second quarter. Others want $13. A reported inquiry for 7,000 tons of prompt basic proves to have referred to business previously closed. There is no demand for this grade, at $14 to $14.50, delivered. Standard low phosphorus is slow at $21, Philadelphia.

Iron and Steel Bars

There is no new buying of steel bars to speak of. Specifications are good. Some makers are doing 1.20c, Pittsburgh, or 1.35c, Philadelphia. Others want $1 more. Bar iron is being bought less freely. The market is 1.22½c to 1.32½c, Philadelphia, but 1.25c probably could be done.

Plates

One or two eastern plate or shape makers are keeping up their order books by day to day buying, but the usual report is quieter buying. Old business keeps operations at fairly favorable rates. Prices are unchanged. The open eastern market remains 1.35c, Philadelphia, or 1.20c, Pittsburgh, with $1 more asked by some for second quarter. Attractive orders still are reported able to bring concessions. In shapes, holders of 1.15c, Pittsburgh, contracts are specifying freely.

Eastern plate mills will supply 10,000 tons or more for the large Memphis bridge awarded the Pennsylvania Steel Co. and the latter will furnish the slabs required. The Worth Bros. Co. and the Central Iron & Steel Co. will supply 3,000 to 4,000 tons of plates and Pittsburgh makers about 1,000 tons of shapes for 22 barges to be built in government navy yards. The Pennsylvania railroad this week specified for some round lots of material for cars to be built at Altoona. The Baltimore & Ohio railroad is out for 1,000 tons of plates additional. The Harlan & Hollingsworth Corporation has taken a ferryboat for the New York Central railroad, 400 to 500 tons.

Sheets

Consumers continue to buy freely for early needs, but there is very little contracting. The leading eastern maker is keeping up full operations. Prices hold at 1.55c to 1.60c, Philadelphia, or 1.40c to 1.45c, Pittsburgh, for No. 10 gage.

Semi-Finished Steel

Eastern Pennsylvania forges are operating better and are buying forging steel more liberally. The Central Iron & Steel Co. is inquiring for 1,500 tons of slabs. Buying of rolling steel is only fair. Quotations are $23.40 to $24.40, Philadelphia, for rolling, and $27.40 to $28.40 for forging steel.

Coke

A Schuylkill valley consumer bought a round tonnage of Connellsville furnace coke for several months shipment at $2, ovens. A Lehigh valley buyer took 20,000 tons of Connellsville for three months at slightly over $2. The recent purchases of the Maryland Steel Co. were 25,000 tons of prompt Connellsville at $2 and slightly less.

Old Material

A Coatesville consumer has purchased 10,000 tons or more of heavy melting steel at $12, delivered, the highest price yet paid. Brokers are holding steel prices around that level though some buyers report they are getting odd lots at less. Apart from steel, the market has weakened and practically all other grades have dropped 50 cents to $1. Buying has been reduced, part of which is attributed to recent storm conditions.

(*For Complete Prices See Page* 528)

Swayne & Mills, a New Firm

Noah H. Swayne II, for 15 years connected with Rogers, Brown & Co. in various capacities, and for the past eight years manager of the Philadelphia office of that company, has resigned, effective April 1, to engage in business for himself. Mr. Swayne has associated himself with Charles W. Mills, of Philadelphia, in the new firm of Swayne & Mills, for the sale of pig iron, coal and coke. Offices will be opened in the Land Title building, Philadelphia. Mr. Mills for several years was secretary of the Bituminous Coal Operators of Central Pennsylvania and for the past four or five years has been operating the Climax coal mines at Lockport Station, Pa.

Charles C. Briggs, 34 years old, recently engaged as a mechanical engineer in California and at one time identified with the steel trade at Pittsburgh, died suddenly, March 9, at the Saratoga hotel, Chicago. He was the son of the late C. C. Briggs, a well known member of the sales organization of the Jones & Laughlin Steel Co., Pittsburgh. After being graduated from the Massachusetts Institute of Technology in 1900, Mr. Briggs became identified with the engineering department of the Jones & Laughlin company, and later was associated with the National Tube Co. and the Carnegie Steel Co., at McKeesport and Sharon, Pa., respectively.

The American Nut Lock Co. is the name of a new concern having offices at Waterville, Me., and manufacturing nut locks at a foundry in Oakland, Me.

Indian Pig at New York

Is quoted at high prices—Bethlehem Steel Co. has heavy bookings

Office of THE IRON TRADE REVIEW,
503-4 West Street Bldg.,
New York, March 10.

Indian pig iron will not be a competitive factor in the eastern market at present prices, as quotations of $17.50, New York docks, without commission, now have been made by the Tata Iron & Steel Co., of Sakchi, for metal which corresponds to medium silicon foundry, off malleable and off basic grades. The price asked is $13, Calcutta or Bombay, with the freight to New York $4.50. This price is at least $3 out of line with the present domestic market for similar analysis. The metropolitan iron market is quieter. Some sellers, however, have been doing well. The Bethlehem Steel Co., which has been an active seller, now has bookings of 90,000 tons, about 60,000 tons of which were entered since Feb. 1. In this district, this seller has sold about 15,000 to 20,000 tons this month. A Paterson, N. J., buyer has taken 1,800 tons of Nos. 1 and 2 plain for second quarter at $15, delivered, for the former and somewhat less than $14.75, delivered, for the lower grades. The Central Foundry Co. has purchased several thousand tons for tidewater delivery, but has deferred action on the rest of its inquiry. There is considerable doubt whether a Bayonne, N. J., buyer took any tonnage recently except for a western plant. The Lackawanna railroad bought 300 tons. A Connecticut consumer is out for 2,000 to 4,000 tons of malleable. Eastern Pennsylvania prices are irregular, some makers still doing $14, furnace, or $14.70, tidewater, for No. 2X, and others holding and working sales as high as $14.75, furnace. Buffalo iron strengthened further in the week and differentials for grades are being enforced strictly. The schedule of some makers is now $13.50 for No. 2X, up to $14.50 for 3.50 to 4 per cent and down to $13 for 1.50 to 2 per cent.

Iron Ore

The market remains at a standstill. Foreign ore recently offered at 7c per unit at tidewater, has brought no response from consumers. The latter, apparently, are waiting for conditions to clarify before acting.

Ferro-Alloys

German makers still will accept $38, seaboard, for ferro-manganese, but there is no evidence in the east that English material is obtainable under $39, seaboard. The market is quiet and sales are small.

Plates and Shapes

As action on structural projects in this district is coming along slowly, makers are not entering so good a volume of new business. The larger tonnages especially are coming in slowly. Recent orders are being well specified with the mills. The 1.20c, Pittsburgh, or 1.36c, New York, price seems minimum, although a large tonnage might possibly shade this with certain mills. Plate tonnage chiefly is of miscellaneous character. The going plate market in this district remains 1.20c, Pittsburgh, or 1.36c, New York.

Iron and Steel Bars

As buyers are well covered and are specifying freely, there remains little new business in steel bars. Now and then, however, makers are putting through some fair orders. Prices remain at 1.20c to 1.25c, Pittsburgh, or 1.36c to 1.41c, New York. Bar iron is quieter and continues from 1.25c to 1.30c.

Cast Iron Pipe

The market is quieter. Prices still lack uniformity. The United States Cast Iron Pipe & Foundry Co. has taken about 1,275 tons, principally 12 and 16-inch high pressure pipe for Newark, N. J., at $19.40, delivered, for the pipe, and $55 for the specials. R. D. Wood & Co. have received the award of 5,500 tons for Boston. Bids on the Rochester letting, 8,700 tons, go in tomorrow.

Old Material

The market is dull and weaker. Consumers are buying sparingly and as material is not coming into the yards very freely at present, the latter are under no pressure to move it actively. The result is a practical stand-off. One eastern Pennsylvania steel maker who bought a round tonnage of steel at $12, delivered, has dropped offers to $11.50. Other steel works offer only $11. Wrought pipe has sold at $11, delivered, or 50 to 75 cents lower.

The Richmond Iron Works, Richmond Furnace, Mass., manufacturer of warm blast charcoal iron which has been grading its iron by fracture since it was established in 1829, has added a chemical department to its organization and now is analyzing all casts and piling them accordingly. The furnaces of this company are the only ones in Massachusetts and are located at Richmond Furnace and at Cheshire. The Richmond Furnace especially has had a historic career. At this furnace was made the iron from which the guns of the ironclad Monitor were cast in civil war times.

Buffalo Sales Decreased

In pig iron and finished material—Storm checks business

Office of THE IRON TRADE REVIEW,
Buffalo, March 10.

Pig iron sales for the week amounted to about 7,500 tons of all grades, and the inquiry remaining to be satisfied totals between 7,000 and 8,000 tons, showing a decline in the market activity, but this is not so with prices. The laxity of trading is attributable in part to the holding up of the decision on the freight rate question; the concern of large manufacturers over the rulings governing car spotting, trap-car service, etc., and in a considerable measure to the fact that the heavy storms in New York, New Jersey and along the New England coast, have virtually snowed under the yards of a large number of users of iron. This situation has caused a number of stop-shipment orders to be sent out, pending the clearing up of the years. While no change in prices took place up to Tuesday noon, the disposition of the interests of the district is to advance the schedules, generally, 25 cents per ton over the prices quoted, making the maximum on No. 1 foundry $14.25 and the minimum on gray forge $13.

Finished Materials

Small orders and light inquiry, with specifications coming in about the same as they have for the past month, characterized the market, according to the mills and agencies. The absence of railroad buying, the holding up of the rate-raise question by the Interstate Commerce Commission, and extended winter weather have all had a tendency to cause buyers to hesitate. The spring buying, expected several months ago, has not developed to the extent figured upon, but the mills and agencies of the dis-

(For Complete Prices See Page 528)

trict feel that the outlook gives reason for confidence that the demand for material will increase as winter conditions wear away. This confidence is added to by the fact that material ordered out from the mills is going into consumption. The jobbing interests report that business so far during the season compares favorably with that booked during the same period of last year, which was one of the strongest experienced by the dealers in this district.

Old Materials

Machine turnings reached the high point about three weeks ago. The offerings at the higher prices soon overtook the demand of the users and the excess tonnages tendered has caused the price to fall off from $6.50 to $7, down to $5.75 to $6.25. Cast iron borings during the day softened to $6.50 to $7. Symptoms of weakening are noted in the other lines, but not enough so as to cause schedules to be reduced at this time. There is a good demand for carwheels at $12 to $12.50.

Steelton Enlarges

Former Milliken mill purchased

The Pennsylvania Steel Co., which is carrying forward some extensive improvements at its Steelton, Pa., works, has purchased the 28-inch convertible structural mill formerly in the plant of Milliken Bros., Inc., Staten Island, N. Y., and now is installing this equipment as well as rearranging a number of its present mills. The Milliken mill, as previously reported, was purchased originally by the Bethlehem Steel Co., which has transferred it to the Pennsylvania Steel Co.

The structural mill will enable the Steelton works to produce an increased range of shape sizes as hitherto they have rolled only the smaller sections. The mill also will increase the capacity of girder rails of this plant. All the mill improvements at Steelton will require several months to complete.

The Pennsylvania Steel Co. is completing some important extensions of its steel works at Steelton and only recently the first duplexing with this capacity was done. These improvements include the enlargement of the Bessemer plant and the building of two 2,500-ton filling and one standard stationary open-hearth furnaces. These enlargements are a part of a general program previously outlined.

The Naugatuck Malleable Iron Co., Naugatuck, Conn., is planning to add a new cleaning department.

Good Showing

Made by Corporation unfilled orders report

A favorable showing of February business was made by the Steel Corporation in its monthly statement of unfilled tonnage, issued March 10 which showed an increase of 412,760 tons, as against the close of January. This increase compares with a gain of 331,572 tons in January, denoting that the Steel Corporation has increased its order books by 744,332 tons over operations since Jan. 1. Unfilled orders on Feb. 28 were 5,026,440 tons, compared with 4,613,680 tons on Jan. 31.

The February increase of tonnage was larger than generally had been expected. It is more favorable than appears upon its face, because production and shipments were heavier in February than in the preceding month and the business days were fewer in number.

A statement of the unfilled tonnage of the Steel Corporation showing the changes in tonnage and percentage by months since the plan of announcing monthly the business on hand was adopted, shows the following:

Date.	Total.	Change, tonnage.	Change, per cent.
Feb. 28, 1914....	5,026,440	412,760+	8.9 +
Jan. 31, 1914....	4,613,680	331,572+	7.74+
Dec. 31, 1913....	4,282,108	114,239—	2.59—
Nov. 30, 1913....	4,396,347	117,420—	2.60—
Oct. 31, 1913....	4,513,767	490,018—	9.79—
Sep. 30, 1913....	5,003,785	219,683—	4.24—
Aug. 31, 1913....	5,223,468	175,888—	3.03—
July 31, 1913....	5,399,356	407,965—	7.03—
June 30, 1913....	5,807,317	517,005—	8.18—
May 31, 1913....	6,324,322	654,440—	9.38—
Apr. 30, 1913....	6,978,762	490,194—	6.55—
Mar. 31, 1913....	7,468,956	187,758—	2.45—
Feb. 28, 1913....	7,656,714	170,654—	2.18—
Jan. 31, 1913....	7,827,368	104,796—	1.32—
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502+	3.40+
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sep. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206,296+	3.46+
July 31, 1912....	5,957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56,363+	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942,806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sep. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,163+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sep. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

Rebuttal Hearings

New York, March 11. (By wire.)—Hearings in rebuttal in the Steel Corporation suit begin March 17. The evidence mostly will be documentary and the proceedings brief. All defendants now have announced formally their cases are closed. Counsel are still waiting for the United States district court in Philadelphia to set the date on which the case may be presented.

(For Complete Prices See Page 528)

METAL MARKETS

New York

March 10.

Copper.—Electrolytic copper is held by leading first hands at 14.37½c, usual terms, and this figure could probably be shaded down to 14.25c, cash. There is very little domestic buying at present. Considerable buying of American electrolytic at low prices is reported from Germany today. Prime lake is quoted nominally at about 14.62½c to 14.75c, cash. Prime casting is held at about 14c to 14.10c, cash. The report of the Copper Producers' Association yesterday showed stocks of 78,371,852 pounds as of March 1, a decrease of over 8,000,000 pounds since Feb. 1. Production during February was 122,561,007 pounds; domestic consumption was 47,586,657 pounds; exports 83,899,183 pounds. The report was considered as being very favorable to the producers.

Tin.—Demand for this metal is dull and the market is nominal. Spot and March today are offered at about 37.62½c; April at 37.75c; May at 37.87½c and June at 38c. The standard market continues to fluctuate within narrow limits. Today's London close was £172 12s 6d on spot and £174 10s for three months. Arrivals so far this month are 2,701 tons, while 2,182 tons still are afloat.

Lead.—Lead is in poor demand, although there is a somewhat better volume of inquiry. Sellers, especially outsiders, are not anxious to sell at the present price, 4c for New York shipment in 50-ton lots.

Spelter.—Demand is dull. The market may be quoted at about 5.30c for New York delivery of prime western brands in 50-ton lots.

Antimony.—There is a fairly good jobbing demand and consumers are coming in more liberally. Cookson's is rather scarce. Prices on large lots, New York delivery, duty paid, are as follows: Cookson's, 7.25c to 7.35c; Hallett's, 7c to 7.25c; United States, 7c to 7.12½c; other brands, 5.87½c to 6.12½c.

Chicago

Chicago, March 10.

Slightly lower quotations are evident in new metals. Copper being 25c to 50c lower and spelter about 12½c under last week's quotation.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Lake copper, carload lots, 14.50c; casting, 14.25c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.20c; lead, desilverized, 3.90c; sheet zinc, $7.25, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 38.25c; Cookson's antimony, 7½c; other grades, 6½c.

No change is apparent in the situation in old metals. Prices remain nominally what they were a week ago and so little trading is being done no insight can be obtained. There are more sellers than buyers and stocks are unusually abundant.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 13.75c; copper bottoms, 12.00c; heavy red brass, 12.50c; heavy yellow brass, 9.25c; No. 1 red brass borings, 11.00c; No. 1 yellow brass borings, 8.25c; brass clippings, 9.50c; lead pipe, 3.85c; zinc scrap, 4.25c; tea lead, 3.75c; No. 1 aluminum, 14.00c; No. 1 pewter, 24c; block tin pipe, 33½c; tin foil, 29.00c; linotype dross, 3c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3c.

Increased Activity in the West

In awarding structural material—Contracts for great Memphis bridge placed

New York, March 11. (By wire.)—The American Bridge Co., it is officially announced, has 9,000 tons for the Widener building, Philadelphia. It also has 5,000 tons for the New York subway section for which the United Realty & Improvement Co. has the general contract. The Virginia Bridge & Iron Works has 900 tons for a bridge for the Atlanta & West Point railway.

Lettings last week were 30,000, not including the main span of the Memphis bridge.

Activity in the structural market in the west seems to have begun with March. Contracts closed the past week aggregate a larger tonnage than has been the case for several months and cover a wide territory, mostly for small tonnages. The official verification of the Memphis bridge letting shows the bridge proper went to the Pennsylvania Steel Co. and the approach to the Virginia Bridge & Iron Co. The Great Northern railroad office building, St. Paul, 8,000 to 9,000 tons, has gone to the Cambria Steel Co. Eastern structural awards make up a considerable list, but the tonnage is comparatively small. The heavier orders are being placed slowly. New awards of the week in the east have been about 6,000 tons, not including the 9,000 tons for the Widener building, Philadelphia. Bids have been extended to March 13 on the fabrication of the 50,000 tons for the third tracking of elevated railroad lines in Manhattan.

CONTRACTS AWARDED.

Arkansas & Memphis Railway Bridge & Terminal Co., superstructure of Mississippi river bridge, Memphis, Tenn., 15,240 tons to the Pennsylvania Steel Co.

Arkansas & Memphis Railway Bridge & Terminal Co., viaduct approach to the Mississippi river bridge, 4,500 tons to the Virginia Bridge & Iron Co.

Tri-Party Building for Great Northern and Northern Pacific Railways and Forest National Bank, St. Paul, Minn., 8,000 to 9,000 tons to the Cambria Steel Co.

Grandstand for Federal League Ball Park, Chicago, 750 to the American Bridge Co.

John F. Jelke Co., addition to factory building, Chicago, 555 tons to Holmes, Pyott & Co.

Lincoln Theater, Spokane, Wash., 387 tons to the Minneapolis Steel & Machinery Co.

St. Louis Frog & Switch Co. foundry building, St. Louis, 302 tons to the Kenwood Bridge Co.

University of Chicago, Classics building, Chicago, 297 tons to the South Halsted Street Iron Works.

Morris & Joseph Hyman, office building, San Francisco, 250 tons to the Western Iron Works.

By the Rosslyn Supply Co., Washington, 500 tons for cylinders for the Lincoln Memorial, Washington, to the Pennsylvania Steel Co.

Warehouse, H. J. Heinz Co., Pittsburgh, 1,800 tons to Riter-Conley Mfg. Co.

Central High School, Washington, 800 tons reinforcing bars to Wm. Dall, Cleveland, general contract.

Highway bridge, Allegheny county, Pa., 1,100 tons, the American Bridge Co.

Capital Park Hotel, Washington, 400 tons awarded to Barber & Ross.

Catanary bridges for electrification of Pennsylvania railroad main line from Philadelphia to Paoli, Pa., 1,000 tons, awarded McClintic-Marshall Co.

Bridge for Chesapeake & Ohio railroad at Roncereate, W. Va., 150 tons awarded McClintic Marshall Co.

Train shed for Delaware, Lackawanna & Western railroad at Buffalo, 2,500 tons, awarded to American Bridge Co.

Bridge work for Oregon & Washington Navigation Co., 1,500 tons, awarded to American Bridge Co.

Two draw bridges for the Southern Pacific railroad, 1,500 tons, awarded to American Bridge Co.

Addition to Long Island Hospital, Brooklyn, 250 tons placed with the American Bridge Co.

Steel framing of turbines for Interborough Rapid Transit Co., Seventy-fourth street and East river, New York City, 225 tons, awarded to Milliken Bros., Inc.

Two transfer bridges for New York Central railroad, Weehawken, N. J., 600 tons, placed with King Bridge Co.

Smelting plant for Burro Mountain Co., Tyronne, New Mexico, 735 tons, placed with independent interests.

Building for Brooklyn Trust Co., Brooklyn, 500 tons, general contract placed with Marc Eidlitz & Son, and steel expected to go to American Bridge Co.

High School of Commerce, Boston, 800 tons, awarded to Levering & Gerrigues.

Bridges for New Haven railroad, at Woodlawn Junction, N. Y., 250 tons, placed with independent fabricators.

Third tracking of the Fulton street elevated railroad, Brooklyn, 12,000 tons, formally awarded by Interborough Rapid Transit Co. to Milliken Bros., Inc. Public Service Commission, New York City, authorized award last week.

Store building, New Rochelle, N. Y., 500 tons, awarded Hedden Iron Works.

First National Bank building, Syracuse, 500 tons, awarded to Ravitch Bros.

Loft building, 15-17 West Forty-fourth street, New York City, 450 tons, awarded to Ravitch Bros.

CONTRACTS PENDING.

Alterations of Harvard Club, West Forty-fourth street, New York City, 820 tons, bids being taken.

Residence at 9 East Seventieth street, New York City, for Mrs. Helen I. James, 450 tons, bids being taken.

Addition to Franklin Square House, Boston, 375 tons, bids taken.

Garage at Bangor, Me., 270 tons, bids being taken.

Three bascule highway bridges for government, Norfolk, Va., bids being taken.

Paper mill at Saranac, N. Y., 225 tons, permanently abandoned.

Chicago street viaduct for City of Buffalo, 1,500 tons, bids asked.

Three bridges for Boston & Maine railroad in New Hampshire, 300 tons, bids asked.

Loft building, Thirty-first street, New York City, 1,800 tons, bids asked.

Bedell store building, Pittsburgh, 300 tons, Thompson-Starrett Co., awarded general contract.

Section No. 4, Seventh avenue subway line, New York City, 9,000 tons, bids being asked.

Highway bridge, Armstrong county, Pa., 800 tons. Bids will be opened March 11.

Columbus hospital, Washington, 550 tons, bids being taken.

McAdoo Hotel, Greensboro, N. C., 500 tons; bids asked.

Double track truss bridge for an eastern Pennsylvania division of Pennsylvania railroad, 300 tons; bids being taken.

Dock and coal handling plant for Holston Corporation, Charlestown, S. C., material for car dumpers, etc. J. W. Frazier Co., Illuminating building, Cleveland, engineer.

Filtration plant to be built by the City of Cleveland, 2,000 to 3,000 tons reinforcing bars.

O'Neill & Kresge building, Akron, 500 tons, Carmichael Construction Co., general contractor.

Severe Tests

In new rail specifications—Car orders limited

New York, March 11. (By wire.)—A leading industrial company is about to enter the market for 3,500 hoppers and gondolas. Rail orders include Kansas City Southern, 5,000; St. Louis Terminal, 6,000, and San Francisco Line, 3,000. Chicago & North Western also has placed 2,000 to 3,000 additional.

Continued conferences are being held by representatives of the rail mills and the Pennsylvania railroad over the new rail specifications put out by the latter this year. Considerable progress in this matter is reported and some expressions have been revived that the order may be placed soon. The chemical tests prescribed by the new specifications are regarded as quite severe by the mills. Among other points, it is provided that test drillings taken from near the base of the head and from a fixed point at one side of the head, shall show only slight deviations from the test heat of the ingot.

The St. Louis & Southwestern railroad has ordered 2,000 cars, divided into 1,500 box, 400 flat and 100 stock cars, all of which went to the American Car & Foundry Co. The Lake Erie, Franklin & Clarion railroad has

placed 100 box cars with the Standard Steel Car Co. Inquiries for cars pending reached 7,000 to 8,000, but new inquiries are fewer.

An important railroad structural order closed in the week is that for the large Memphis bridge requiring 21,000 to 22,000 tons.

Car business in the west is almost at an absolute zero. A number of inquiries in the east, which were counted on to yield some business for western makers, are still pending, and few new inquiries have come out. The Illinois Central has asked for 500 refrigerator cars, which is the only inquiry of importance.

CAR AND LOCOMOTIVE ORDERS.

The Union Pacific railroad is receiving bids on 58 locomotives.

The Missouri Pacific railroad has placed 83 coaches with the American Car & Foundry Co.

The Southern railroad has taken bids on 45 steel passenger equipment, in addition to a number of freight cars, as previously reported.

The Atlantic Coast line is in the market for 15 steel passenger cars.

The Missouri, Kansas & Texas railway has ordered 25 Mikado freight locomotives from the American Locomotive Co.

The Southern Railway Co., which last week was reported as ordering 27 locomotives from the American Locomotive Co., has placed 21 additional with the Baldwin Locomotive Works.

The Buffalo, Rochester & Pittsburgh railroad has awarded 10 locomotives to the American Locomotive Co.

The Chicago & Illinois Midland railway has placed two Mikado freight locomotives with the American Locomotive Co.

RAIL ORDERS AND INQUIRIES.

The Pekin & Kalgan railroad of China has placed 8,500 tons of 65 and 85-pound sections with the United States Steel Products Co.

The Chicago Junction railroad has ordered 2,000 tons of rails from the Illinois Steel Co.

The Australian State Railway has inquired in this country for a round tonnage of rails.

Blowing in Furnaces

New York, March 11. (By wire.)—Five additional furnaces at Joliet, Wenburg, Schoenberger, Bellaire and Duquesne, are being put in this week by the Steel Corporation and one at Sharon is going out. Furnace operations of the Corporation are now 75 per cent and ingots remain around 80. The Corporation's iron stocks have been steadily declining.

Will Resume

Pittsburgh, March 11. (By wire.)—Three furnaces are scheduled to resume operations at Buffalo, and Grace furnace at Brier Hill will come in this week.

The French Mfg. Co., Waterbury, Conn., has let a contract for an addition to its Robbins street plant.

Big Coke Oven Contract

Made by the Lehigh Coke Co. with H. Koppers Co. for plant at South Bethlehem

Chicago, March 10. — The Lehigh Coke Co., South Bethlehem, Pa., today signed a contract with the H. Koppers Co., Chicago, for a by-product coke plant at South Bethlehem to consist of four batteries of 106 ovens each, making a total of 424 ovens. The capacity of each oven is 13¼ tons.

This is said to be the largest contract for a by-product plant ever made in this or any other country. This is not, however, the largest by-product plant, as that of the United States Steel Corporation at Gary, Ind., with 560 ovens, was not built under a contract.

The cost of the construction will be in excess of $3,000,000. The plant, when working full, will carbonize 5,000 gross tons of coal each 24 hours and will supply 60,000,000 cubic feet of gas daily. This gas will be used as fuel at the plant of the Bethlehem Steel Co. The coke will also be utilized by the Bethlehem Steel Co. Other by-products will be disposed of on the market.

Construction will be started at once and the contract calls for completion of the first two batteries, consisting of 212 ovens, in 300 working days. The remainder of the plant is to be completed 360 working days after the old plant is turned over to the contractor for demolition.

An interesting feature of the contract is the fact that some time ago a German concern erected a plant consisting of four batteries of 75 ovens each, which has not proved satisfactory and is to be replaced by the Koppers plant. The contract was taken in competition with builders from this country and Europe.

The Lehigh Coke Co., in which Chas. M. Schwab, president of the Bethlehem Steel Co., is said to be interested, is capitalized at $15,000,000.

Making Small Steel Castings

An address by C. S. Koch, president and general manager of the Fort Pitt Steel Casting Co., McKeesport, Pa., formed the chief feature of the regular monthly meeting of the Pittsburgh Foundrymen's Association, March 9. The title of Mr. Koch's address was, "Some Features in the Manufacture of Small Steel Castings as a Specialty". The paper was very thorough and shed an interesting light on numerous problems which arise in steel foundries handling light work. It was stated that the molding and finishing departments are more important from a profit and loss standpoint than the melting department. The necessity for adequate cost records was vigorously emphasized. The full text of the paper will be published in next week's issue.

Heavy Shipments

Made by the Steel Corporation last month

New York, March 11. (By wire.)—The favorable showing of unfilled orders for February by the United States Steel Corporation is further emphasized by the fact that the shipments of that period exceeded those of January by 6,000 tons daily. This fact effectually disposes of some rumors that the increase was due to falling off of shipments largely because of storms. The bookings of February averaged better than 50,000 tons daily. Business was of a very miscellaneous character and orders passed to mills included but comparatively small tonnage for the Standard Oil Co., despite some reports. The rail tonnage was about 12,000.

The Corporation continues to hold for 1.25c for March and 1.30c for second quarter on shapes, plates and bars.

Will Cut Wages

Pittsburgh, March 11. (By wire.)—With the reduction of 15 cents in the boiling rate for puddlers identified with the Amalgamated Association of Iron, Steel and Tin Workers, making the scale for March and April $5.70 a ton, it is probable that owners of mills controlled by the United Sons of Vulcan or operated under open-shop policies will cut wages. Puddling mills no longer connected with either organization and those operated under a tentative agreement with the Sons of Vulcan are paying $6 per ton for boiling. Owners of these mills are considering a change in the wage scale.

Heinz Building Award

Pittsburgh, March 11. (By wire.)—The Riter-Conley Mfg. Co. has received the contract for the H. J. Heinz Co. building, Pittsburgh, involving 2,000 tons.

The Independents Show Power

Despite record Corporation ore shipments, their percentage is larger —Details of 1913 movement from Superior ranges

By R V Sawhill

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Independent ore mining companies of the Lake Superior district, in 1913 demonstrated their capacity to handle increasing tonnages. In the face of the largest shipments ever made by the Steel Corporation, they not only maintained their relative position but strengthened it, forwarding the largest percentage of any year during the period from 1905 to 1914. The independents last year shipped 50.94 per cent of the season's movement, compared with 50.54 per cent in 1912 and 47.3 per cent in 1911.

The shipments in 1913, as shown by the official figures just compiled by THE IRON TRADE REVIEW, were 49,947,116 tons, against 48,221,546 tons in 1912, a gain of 1,725,570 tons. The movement by lake was 49,070,478 tons, compared with 47,435,777 tons in 1912, an increase of 1,634,701 tons. The all-rail shipments in 1913 were 876,638 tons, against 785,769 tons in 1912, a gain of 90,869 tons.

The tremendous activity shown by the Steel Corporation, in the past three years, in mining on the properties covered by the "Hill ore lease" was not so pronounced in 1913. The annual report of the trustees of the Great Northern ore properties has not been issued, but the shipments under the "Hill" lease in 1913 were about 5,150,000 tons, or less than in either 1911 or 1912.

Under the terms of the lease, the minimum tonnages to be mined were as follows:

	Gross tons.
1907	750,000
1908	1,500,000
1909	2,250,000
1910	3,000,000
1911	3,750,000
1912	4,500,000
1913	5,250,000
1914	6,000,000
1915	6,750,000
1916	7,500,000
1917	8,250,000

The minimum required to be mined up to the beginning of 1913 was thus 15,750,000 tons, while the actual shipments were 15,322,647 tons. The shortage at the beginning of last year was, therefore, only 427,353 tons, compared with a deficit of 3,417,862 on Jan. 1, 1912, and 5,167,621 tons at the beginning of 1911. The required minimum for 1913 was 5,250,000 tons, which added to the shortage on Jan. 1, 1913, of 427,353 tons necessitated a movement of 5,677,353 tons to satisfy the terms of the lease for the period from 1906 to Jan. 1, 1914. As actual shipments last year were about 5,150,000 tons, the shortage at the present time is about 525,000 tons. The minimum requirement for 1914 is 6,000,000 tons, so that the total tonnage to be shipped before the surrender of the lease at the close of this year, is 6,525,000 tons.

COMPARATIVE SHIPMENTS BY RANGES, 1913 AND 1912.

	1913.	1912.	Increase.
Mesabi	34,038,643	32,047,409	1,991,234
Menominee	4,965,604	4,711,440	254,164
Gogebic	4,531,558	5,006,266	†474,708
Marquette	3,966,680	4,202,308	†235,628
Vermillion	1,566,600	1,844,981	†278,381
Cuyuna	733,021	305,111	427,910
Miscellaneous in Wisconsin	145,010	104,031	40,979
Totals	49,947,116	48,221,546	1,725,570
By lake	49,070,478	47,435,777	1,634,701
By rail	876,638	785,769	90,869

†Decrease.

The shipments from the Hill lands in 1907 were 137,270 tons; in 1908, 508 tons; in 1909, 41,624 tons; in 1910, 2,152,977 tons; in 1911, 5,499,759 tons; while in 1912 they were 7,490,509 tons. The principal shippers from the Hill lands for the last three years are as follows:

	1913. Gross tons.	1912. Gross tons.	1911. Gross tons.
Dale	621,415	1,106,808	1,002,292
Harold	92,054	187,926	281,293
Hill	855,965	1,188,908	1,550,568
Leonard	1,253,367	2,198,119	1,293,463
Mace	140,953	136,524	124,721
Mississippi	122,972	274,729	328,601
Uno North	381,632	545,033	479,315
Uno South	1,202,341	1,305,216	266,390
	4,670,699	6,943,263	5,326,643

The following table shows the shipments and percentage of the Oliver Iron Mining Co., the Steel Corporation's mining organization, from 1905:

Year.	Gross tons.	Per-centage.
1906	20,414,811	53.00
1907	22,710,898	56.00
1908	14,123,957	56.00
1909	21,397,866	50.36
1910	21,661,143	49.86
1911	17,282,499	52.7
1912	23,845,363	49.46
1913	24,502,244	49.06
Total	165,938,781	51.24

The Mesabi range again established a new record in 1913, shipping 34,038,643 tons, against 32,047,409 tons in 1912, an increase of 1,991,234 tons. Its percentage of the total shipments was 68.15, against 66.46 in 1912, and 67.37 in 1911. The percentage of shipments from the Mesabi was the highest of any year since the range was developed. The Menominee range which ranked third in 1912, was the second largest shipper last year, forwarding 4,965,604 tons, against 4,711,440 tons in 1912, an increase of 254,164 tons. Its percentage in 1913 was 9.94 against 9.77 in 1912 and 11.93 in 1911. Menominee shipments were the second largest in its history, being surpassed by 1906, when 5,109,088 tons were shipped. The Gogebic, Marquette and Vermillion failed to equal their best previous records, each showing a decline from the 1912 movement. Gogebic shipments were 4,531,558 tons in 1913, and 5,006,266 tons in 1912, a decline last year of 474,708 tons. Its percentage was 9.07, compared with 10.38 in 1912 and 7.94 in 1911. Marquette shipments were 3,966,680 tons, against 4,202,308 tons in 1912, a decline of 235,628 tons. Its percentage was 7.94, compared with 8.71 in 1912 and 8.64 in 1911. Vermillion shipments were 1,566,600 tons, against 1,844,981 tons in 1912, a decline of 278,381 tons. Its

Last year easily established a new record for ore shipments, 1912 having been the previous record-holder. The year ranking third is 1910, when 43,442,397 tons were forwarded, or 6,504,719 tons less than in 1913. The lake shipments in 1913 also established a new high mark, 1912 ranking second and 1910 third with 42,628,758 tons, or 6,441,720 tons less than in 1913. The all-rail shipments last year were smaller than in 1906, 1907 and 1909.

In two other years since 1905, the independents have shipped more than half of the season's movement, in 1910 with 50.14 per cent, and in 1912. In 1907 and 1908 they shipped only 44 per cent, while in 1906 their percentage was 47. In 1911 they shipped 47.3 per cent and in 1909, 49.64 per cent. With the exception of 1911, a poor year, the independents' shipments have more than held their own with the Steel Corporation's since 1908.

OFFICIAL RECORD OF SHIPMENTS FROM LAKE SUPERIOR DISTRICT IN 1913 AND 1912

MESABI RANGE

	1913.	1912.
Adams	1,580,196	993,523
Adriatic	110,534	102,478
Agnew	101,549	101,498
Albany	345,162	244,669
Alberta	5,219	1,455
Allan	50,222	.....
Bangor	119,705	130,997
Bennett	88,931	.....
Bessemer	.....	136,010
Biwabik	300,924	312,378
Bray	102,439	164,732
Brunt	202,969	215,585
Burt	622,951	.....
Canisteo	1,099,727	2,099,880
Cavour	118,404	47,919
Chisholm	641,788	695,859
Clark	402,893	500,768
Commodore	484,188	576,855
Corsica	225,140	196,188
Crescent	1,022	.....
Crosby	219,065	188,368
Croxton	50,033	146,290
Cyprus	82,121	100,063
Dale	621,415	1,106,808
Eaton	3,548	.....
Elba	126,236	168,990
Elizabeth	17,105	392
Fayal	1,257,430	468,019
Fowler	72,087	204,584
Franklin	51,760	69,993
Genoa	1,141,673	1,315,840
Gilbert	104,538	135,622
Glen	15	.....
Grace	122,110	60,641
Graham	100,289	.....
Grant	687,987	399,848
Hanna	264,318	211,822
Harold	92,054	187,926
Hartley	7,506	.....
Hawkins	568,919	473,120
Helmer	25,641	.....
Hill	855,965	1,188,908
Holman	751,422	919,699
Hudson	240,513	224,548
Hull-Rust	3,457,608	2,232,112
Humphrey	.....	133
Iroquois	111,159	80,000
John Jr.	15,461	.....
Judd	103,495	.....
Kellogg	.....	127,412
Kinney	396,394	530,080
Knox	20,123	101,169
La Belle	10,038	14,896
Larkin (Tesora)	69,200	16,542
La Rue	172,337	155,552
Laura	184,530	270,411
Leetonia	501,248	368,301
Leonard	1,253,367	2,198,119
Leonard-Burt	2,862	.....
Leonard-Glen	.....	15,932
Lincoln	215,957	173,979
Longyear	11,799	.....
Mace	140,953	136,524
Madeira	2,805	46,494
Madrid	86,053	26,906
Mahoning	1,515,428	1,518,643
Malta	93,632	2,817
Meadow	25,106	10,629
Mesabi Chief	2,023	.....
Miller	344,547	301,518
Minorca	90,837	37,235
Missabe Mt.	321,835	5,592
Mississippi	122,972	274,729
Mohawk	171,849	161,539
Monica	62,032	92,754
Monroe	485,847	.....
Morris	.....	395
Morrow	91,512	.....
Morton	29,989	5,948
Myers	39,951	101,558
Norman	276,732	614,002
Onandaga	6,847	.....
Pearce	123,948	.....
Pearson	104,180	75,969
Perkins	120,012	60,523
Pettit	131,864	157,208
Roberts	13,387	12,384
Ruddy	35,242	36,551
Sauntry-Alpena	1,705,131	1,025,301
Schley	202,477	159,126
Scranton	227,270	254,500
Section 17	16,646	4,203
Sellers	268,070	.....
Seville	24,114	6,023
Shenango	794,911	805,413
Sliver	298,006	378,541
Spruce	544,876	740,801
St. Paul	1,375	42,597
Stevenson	634,656	682,514
Susquehanna	904,019	583,910
Troy	70,748	.....
Union	286,934	213,829
Uno North	381,632	545,033
Uno South	1,202,341	1,305,216
Utica	352,932	223,006
Virginia (P., M. & Co.)	391,109	200,182
Vivian	9,093	.....
Wacootah	43,549	129,073
Webb	236,579	166,636
White Iron	7,957	49,590
Whiteside	76,897	275,915
Williams (N. Cinci.)	76,703	39,274
Winifred	43,109	91,806
Woodbridge	163,757	68,089
Yawkey	40,878	.....
Total	34,038,643	32,047,409

MENOMINEE RANGE

	1913.	1912.
Antoine (Clifford)	95,310	.....
Aragon	230,958	244,894
Armenia	83,142	150,808
Baker	24,286	.....
Baltic	130,631	100,736
Bengal	23,259	.....
Berkshire	.....	33,419
Bristol (Claire)	379,168	435,619
Calumet	18,976	35,587
Caspian	295,841	306,913
Chapin	370,211	327,571
Chatham	107,608	134,079
Chicagon	137,002	149,619
Commonwealth (Buckeye)	128,214	49,964
Cortland	19,332	17,498
Crystal Falls	7,389	665
Cundy	2,543	.....
Davidson	195,448	126,207
Dunn	14,912	242,304
Fairbanks (Paint River)	2,289	.....
Florence	.....	99,682
Fogarty	124,568	84,074
Forbes	69,435	.....
Genesee (Ethel)	.....	4,248
Gt. Western	50,465	3,342
Groveland	9,251	14,320
Hemlock	110,511	126,132
Hiawatha	160,510	220,106
Hollister	25,251	.....
James	188,966	75,702
Loretto	158,257	136,045
Mansfield	190,503	.....
McDonald	16,499	1,384
Michigan	27,917	.....
Millie	.....	1,165
Munro	18,508	20,100
Penn. Iron Mining Co.	416,244	429,150
Pewabic	364,176	279,769
Ravenna	70,763	18,301
Richards	46,170	.....
Riverton Grp.	160,818	177,496
Tobin	154,896	319,318
Tully	16,650	.....
Virgil	48,945	2,996
Vivian	27,177	28,800
Wickwire	47,697	40,417
Youngs	44,091	83,528
Zimmerman	150,817	189,482
Total	4,965,604	4,711,440

MARQUETTE RANGE

	1913.	1912.
Adams (Amer. Min. Co.)	1,504	.....
American (Sterling)	162,253	133,306
Austin	107,366	102,530
Breitung Hematite	104,757	122,320
Cambria	169,473	69,904
Chase	52,930	.....
Cleve. Cliffs Gr.	997,520	1,004,684
Empire	38,534	32,933
Imperial	37,542	54,053
Jackson	1,519	50,166
Lake Angeline	104,357	151,910
Lake Superior	203,964	219,673
Lillie	.....	109,548
Lloyd	135,746	44,467
Lucy (McComber)	2,025	73,120
Maas	170,705	46,249
Mary Charlotte	264,120	260,801
Milwaukee-Davis	10,412	11,537
Mitchell	15,970	21,141
Morris	18,394	1,286
Negaunee	326,877	446,318
Princeton (Swanzey)	53,476	162,138
Queen Group	298,504	351,916
Republic	137,063	156,864
Richmond	138,394	118,554
Roll'g Mill	163,286	115,784
Stegmiller	45,431	50,963
Stephenson	96,279	214,386
Volunteer	47,698	9,008
Washington	60,581	66,749
Total	3,966,680	4,202,308

GOGEBIC RANGE

	1913.	1912.
Anvil	.....	56,854
Ashland	2,635	211,927
Asteroid	42,417	70,240
Atlantic	119,770	142,080
Brotherton	70,138	148,930
Cary	217,349	308,292
Castile	57,595	136,703
Colby	305,744	245,195
Eureka	14,562	65,716
Geneva	31,303	.....
Harmony (Germania)	.....	27,950
Iron Belt	.....	2,808
Ironton	166,123	173,135
Mikado	33,111	.....
Montreal	219,469	247,772
Newport	1,146,730	973,391
Norrie Group	1,503,443	1,500,732
Ottawa (Odanah)	50,521	111,396
Palms	88,682	39,552
Pence	.....	14,924
Plumer	51,053	47,578
Puritan	64,463	90,683
Royal	10,659	.....
Sunday Lake	133,475	155,485
Tilden	97,573	158,151
Wakefield	15,261	.....
Yale (West Colby)	89,482	76,772
Total	4,531,558	5,006,266

VERMILLION RANGE

	1913.	1912.
Chandler	51,403	73,370
Pioneer	520,124	647,237
Savoy	74,971	90,528
Section 30	136,359	157,344
Sibley	249,255	309,076
Soudan	100,885	88,714
White Iron	.....	30
Zenith	433,603	478,682
Total	1,566,600	1,844,981

CUYUNA RANGE

	1913.	1912.
Armour No. 1	105,087	49,539
Armour No. 2	175,665	49,031
Barrows	9,089	.....
Cuyuna Mille-Lacs	24,434	.....
Ironton	2,936	.....
Kennedy	267,023	196,653
Pennington	101,136	.....
Thompson	47,651	9,888
Total	733,021	305,111

MISCELLANEOUS IN WISCONSIN

	1913.	1912.
Iron Ridge	26,213	19,284
Mayville	118,797	84,747
Total	145,010	104,031

	1913.	1912.
GRAND TOTAL	49,947,116	48,221,546

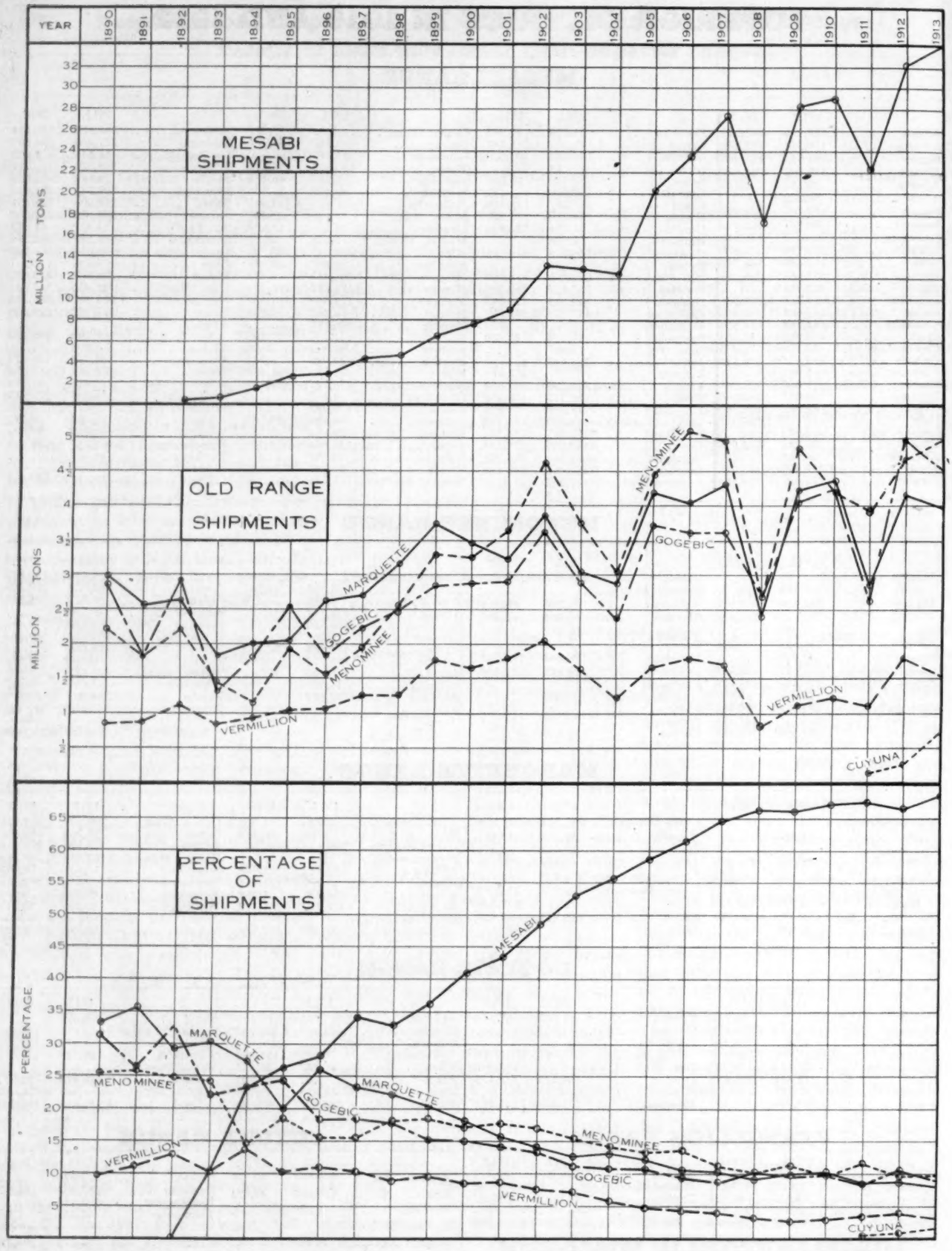


CHART SHOWING SHIPMENTS OF MESABI RANGE, 1892-1913; OLD RANGES, 1890-1913; PERCENTAGE OF SHIPMENTS OF ALL RANGES, 1890-1913

percentage was 3.14, against 3.83 in 1912 and 3.32 in 1911.

The Cuyuna range more than doubled its 1912 movement yast year, shipping 733,021 tons, an increase of 427,910 tons over 1912 with 305,111 tons. Its percentage was 1.47 against 0.63 in 1912 and 0.45 in 1911.

As in 1912, 11 mines shipped more than a million tons each last year. Those mines reaching this figure in 1913 were the Adams, Canisteo, Fayal, Genoa, Hull-Rust, Leonard, Mahoning, Sauntry-Alpena and Uno South on the Mesabi, and the Newport and Norrie Group on the Gogebic. For 1912, the million-ton shippers were the Canisteo, Dale, Genoa, Hill, Hull-Rust, Leonard, Mahoning, Sauntry-Alpena and Uno South, on the Mesabi; the Norrie Group on the Gogebic and the Cleveland-Cliffs Group on the Marquette. Six attained that figure in 1911, the Canisteo, Dale, Hill, Leonard, Mahoning and Sauntry-Alpena, all Mesabi properties. In 1910, nine mines shipped more than a million tons each, they being the Adams, Burt, Canisteo, Fayal, Hull-Rust, Mahoning and Morris, on the Mesabi and the Newport and Norrie Group on the Gogebic.

The Hull-Rust again led in shipments, making six out of the last seven years that this mine has led all other properties. The Hill was the leading producer in 1911. The Hull-Rust's shipments last year were 3,457,608, the fifth year it has shipped over 3,000,000 tons and the heaviest shipments in the history of this great mine. The Sauntry-Alpena was the second largest shipper with 1,705,131 tons, and the Adams third with 1,580,196 tons. The Mahoning continued its steady shipment of a million and a half tons a year, the 1913 figure being 1,515,428 tons.

The following new properties shipped:

On the Mesabi: Allan, Matapedia Mining Co.; Bennett, Keewatin Mining Co.; Eaton, Kabekona Iron Co.; Graham, Judd and Vivian, Oliver Iron Mining Co.; Helmer, Swallow & Hopkins Mining Co.; Mesabi Chief, Arthur Iron Mining Co.; Morrow, Joseph Sellwood.

On the Gogebic: Royal, Oliver Iron Mining Co.; Wakefield, Wakefield Iron Co.

On the Menominee: Bengal, Pickands, Mather & Co.; Forbes, Jones & Laughlin Ore Co.; Richards, Corrigan, McKinney & Co.

On the Marquette: Adams (American Mining Co.), operated by Oliver Iron Mining Co.; Chase, Cleveland-Cliffs Iron Co.

On the Cuyuna: Barrows, Virginia Ore Mining Co.; Cuyuna Mille-Lacs, Cuyuna Mille-Lacs Iron Co.; Ironton, Cuyuna-Duluth Iron Co.; Pennington, Tod-Stambaugh Co.

There were thus 20 new shippers in 1913, compared with 13 in 1912, 12 in 1911, and 16 in 1910. Of the 20 new mines shipping last year, the Mesabi had nine, the Cuyuna four, the Menominee three and the Gogebic and Marquette two each. Shipments from new mines in 1913 totaled 831,567 tons; in 1912, 361,904 tons; in 1911, 1,769,423 tons; in 1910, 1,734,044 tons.

Three mines, idle for years, shipped again last season. They were the Longyear, on the Mesabi, idle since 1905; the Fairbanks (Paint River), on the Menominee, idle since 1907, and the Geneva, on the Gogebic, which shipped last in 1903.

The Crescent shipment, listed on the Mesabi, was a trespass. The new Morrow mine is not to be confused with the old Morrow mine, which has not shipped for a number of years. The White Iron mine, shown on the Mesabi, is the new name of the old Euclid mine. The Norman and Missabe Mountain shipments were carried previously under the one heading of Virginia Group. The John Jr. is the new name of the old Platt mine.

Shipments from Canadian mines were as follows: Helen of the Lake Superior Corporation, 42,550 tons; Magpie, of the Lake Superior Corporation, 19,934 tons; Moose Mountain, of Oglebay, Norton & Co., 102,238 tons. The Helen shipped 48,838 tons in 1912; 128,628 tons in 1911, and 115,790 tons in 1910. The Moose Mountain shipped 39,061 tons in 1912; 6,678 tons in 1911, and 72,470 tons in 1910. The Magpie has been idle for some time. These mines are not included in our figures for Lake Superior ore shipments.

There were 223 shippers in 1913, compared with 194 in 1912, 184 in 1911, 196 in 1910, and 172 in 1909. Of those shipping last year, the Mesabi had 110, Menominee 44, Marquette 29, Gogebic 23, Cuyuna 8, Vermillion 7 and the Wisconsin fields 2. For 1912, the figures were: Mesabi, 92; Menominee, 37; Marquette, 28; Gogebic, 23; Vermillion, 8; Cuyuna, 4, and the Wisconsin fields, 2. In 1911 the Mesabi had 90, Menominee 38, Marquette 29, Gogebic 17, Vermillion 7, Cuyuna 1, and the Wisconsin fields, 2.

There were 12 mines which shipped in 1912 and were idle in 1913. The list is as follows: Bessemer, Kellogg, Leonard-Glen, Mesabi range; Berkshire, Florence, Genesee (Ethel), Millie, Menominee range; Lillie, Marquette range; Anvil, Harmony (Germania), Iron Belt, Pence, Gogebic range.

The following table shows the average shipments of the mines on the five leading ranges and of the district for 1913 and 1912:

	Average mine production, gross tons. 1913.	1912.
Mesabi	309,442	348,341
Vermillion	223,800	263,564
Gogebic	197,024	217,664
Marquette	136,782	150,082
Menominee	112,855	127,336
Lake Superior district	223,978	249,853

SHIPMENTS BY PORTS AND ALL-RAIL, GROSS TONS.

	1913.	1912.	1911.	1910.	1909.	1908.
Escanaba	5,399,444	5,234,655	4,278,445	4,959,726	5,747,801	3,351,502
Marquette	3,137,617	3,296,761	2,200,380	3,248,516	2,909,451	1,487,487
Ashland	4,338,230	4,797,101	2,429,290	4,094,374	3,834,207	2,513,670
Two Harbors	10,075,718	9,370,969	6,367,537	8,271,177	9,181,132	5,702,237
Superior	13,788,343	14,240,714	9,920,490	8,414,799	6,540,505	3,564,030
Duluth	12,331,126	10,495,577	6,934,269	13,640,166	13,470,503	8,808,168
Total by lake	49,070,478	47,435,777	32,130,411	42,628,758	41,683,599	25,427,094
Total by rail	876,638	785,769	662,719	813,639	903,270	587,893
Total	49,947,116	48,221,546	32,793,130	43,442,397	42,586,869	26,014,987

SHIPMENTS BY RANGES, GROSS TONS.

	1913.	1912.	1911.	1910.	1909.	1908.
Marquette	3,966,680	4,202,308	2,833,116	4,392,726	4,256,172	2,414,632
Menominee	4,965,604	4,711,440	3,911,174	4,237,738	4,875,385	2,679,156
Gogebic	4,531,558	5,006,266	2,603,318	4,315,314	4,088,057	2,699,856
Vermillion	1,566,600	1,844,981	1,088,930	1,203,177	1,108,215	841,544
Mesabi	34,038,643	32,047,409	22,093,532	29,201,760	28,176,281	17,257,350
Cuyuna	733,021	305,111	147,431	.....	.....	.....
Miscellaneous	145,010	104,031	115,629	91,682	82,759	122,449
Total	49,947,116	48,221,546	32,793,130	43,442,397	42,586,869	26,014,987

Pottstown Iron Receipts Less

President Andrew Wheeler, of the Pottstown Iron Co., Pottstown, Pa., in his annual report says: "It is too early to speak with certainty as to the prospects for the coming year, but just now the outlook is somewhat encouraging." The year at the Hopewell mine, which it was hoped would be a source of profit, was spent in prospecting and in the sinking of a new shaft, but a good body of ore now is in sight. The company's share of the profits of operation in 1913 were $14,853, compared with $20,399 in 1912. In the second half the receipts were only $6,526.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

Chairman E. H. Gary, of the United States Steel Corporation, who has been detained at his home by a cold, is again at his office.

D. B. Meacham, of Rogers, Brown & Co., Cincinnati, who has been on a several weeks' cruise of the West Indies, has returned.

M. P. Fillingham has been made district sales manager of the Van Dorn & Dutton Co., with offices at 50 Church street, New York City.

Dr. Richard Moldenke addressed the New England Foundrymen's Association, at the Exchange Club, Boston, March 11, on "Co-Operation Among Foundries".

F. H. Zulauf was recently appointed sales manager of the Van Dorn Electrical Tool Co., Cleveland. Mr. Zulauf started with this company as an office boy.

A. A. Fowler, resident partner of Rogers, Brown & Co., at New York city, who has been abroad for several months has sailed for home on the Mauretania and will arrive this week.

Earl A. Averill has resigned as managing editor of the mechanical edition of *The Railway Age Gazette*, to become engineer of operation of the Standard Stoker Co., Grand Central Terminal, New York City.

JOHN E. WOODS

George A. Gallinger, of Pittsburgh, has been placed in charge of the pneumatic tool department of the Ingersoll-Rand Co., with the title of manager of pneumatic tool sales. His headquarters will be at 11 Broadway, New York.

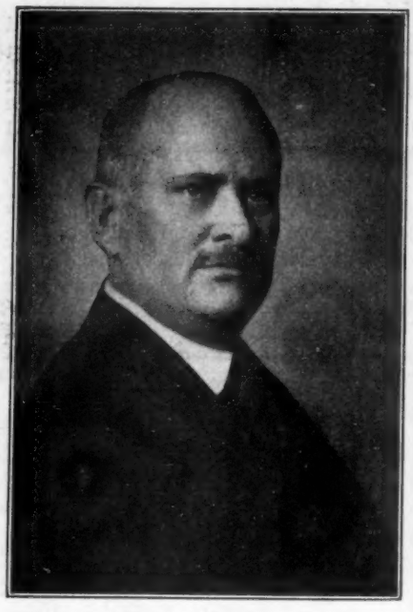
William L. Austin, William Burnham, Otis H. Cutler, T. DeWitt Cuyler, Alba B. Johnson, Samuel McRoberts, Charles D. Norton, Edward T. Stotesbury, Samuel M. Vauclain, Francis M. Weld, John G. Shedd and Samuel F. Pryor have been re-elected as directors of the Baldwin Locomotive Works.

HENRY SOUTHER

John E. Woods, manager of sales, at Cincinnati, for the Carnegie Steel Co., Illinois Steel Co. and the Tennessee Coal, Iron & Railroad Co., graduated from Washington and Jefferson college in 1887, and entered the employ of Carnegie, Phipps & Co., at the Homestead Steel Works the same year. He has since been continuously connected with the Carnegie interests in various capacities. He is a member of the American Iron and Steel Institute, and of various clubs in Pittsburgh, Cincinnati and Columbus.

Benjamin Bowditch Thayer, the newly elected president of the American Institute of Mining Engineers, was born in San Francisco in 1862. He prepared for Harvard University at Quincy, Mass., and was graduated from the Lawrence Scientific School in 1885. On leaving college, he engaged in mining in the Rocky Mountain section and in the Sierra Madre in Mexico. After years of experience in underground work and in administrative relations in a number of mining districts, he became identified with copper mining in Butte and some years ago was elected president of the Anaconda Copper Mining Co., which office he still holds. He became a member of the Institute in 1887.

Henry Souther has identified himself with the Ferro Machine & Foundry Co., Cleveland, and has been elected vice president of that concern. Since his graduation from the Massachusetts Institute of Technology in 1887. Mr. Souther has been prominent in the fields of metallurgy and engineering. He began his career with the Pennsylvania Steel Co., Steelton, Pa., leaving there in 1893 to become engineer for the Pope Mfg. Co., Hartford, maker of bicycles, tires, seamless steel tubing and motor vehicles. In 1899, Mr. Souther opened an office at Hartford as a consulting engineer and had among his clients iron, brass and aluminum foundries, also makers of drop forgings, machine tools and mining machinery. He was president of the Society of Automobile Engineers in 1911, and the last four years he has been especially identified with the Standard Roller Bearing Co. His experience with the motor industry has been very broad.



BENJ. B. THAYER

Building a Plant For All Time

A Diesel engine factory constructed on ideals of effectiveness without regard for first cost

SIGNIFICANCE is attached to the construction of a large plant for the manufacture of Diesel engines in St. Louis by the Busch-Sulzer Bros.-Diesel Engine Co., because it affords tangible evidence of the growth of the demand for economical prime movers. The day has passed when the American manufacturer can afford wasteful methods of generating power. The cost of power enters heavily into the expenses of manufacture in many lines of industry and no plant can realize its highest success in these days of world-wide competition unless this element in the cost of production is kept at a minimum. In Europe, where coal is less abundant and more expensive, Diesel oil engines have been in operation over 12 years. In this country Diesel engine installations are multiplying rapidly and the Busch plant is the first to be constructed in America exclusively for the manufacture of this type of motor.

The familiar history of the development of the Diesel engine has been traced through its successive stages in numerous articles in THE IRON TRADE REVIEW. The Busch-Sulzer Bros.-Diesel Engine Co. has been closely identified with the introduction of this motor in the United States and owns the American rights on all of the original and subsequent patents granted to the late Dr. Rudolph Diesel. Adolphus Busch, who died recently, became acquainted with Dr. Diesel in 1897, and at his request an investigation of the claims of the inventor was made by Colonel E. D. Meier, past president of the American Society of Mechanical Engineers. Colonel Meier's report was favorable and Mr. Busch therefore decided to furnish the money necessary to develop the Diesel engine in this country. What is said to be the first commercial engine was built in 1898 and operated in the Anheuser-Busch brewery, at St. Louis, until 1911. It was rated at 60 horsepower. In 1910 the Busch-Sulzer Bros.-Diesel Engine Co. was organized and soon afterward plans were commenced for the construction of the plant at St. Louis. The first unit of this works is now complete and in operation.

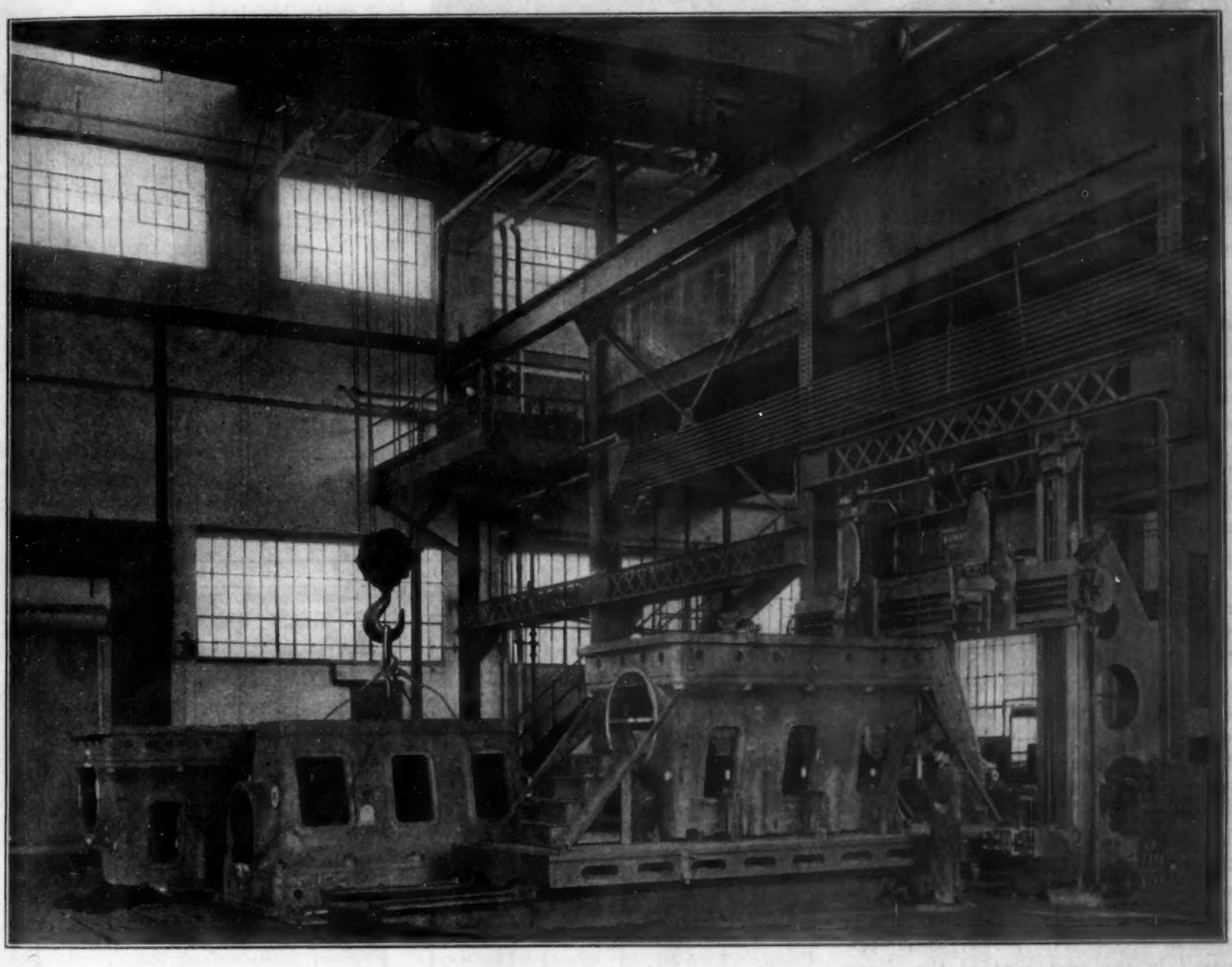


FIG. 1 — PLANING ENGINE FRAMES IN MACHINE SHOP

It is located at Utah and Second streets on the west bank of the Mississippi river. The site occupies an area of 8 1/3 acres and the original surface of the ground slopes from an elevation of 70 feet at the southwest corner to about 20 feet at the northeast corner. The general layout of the shops is shown in Fig. 3. The present buildings are in two

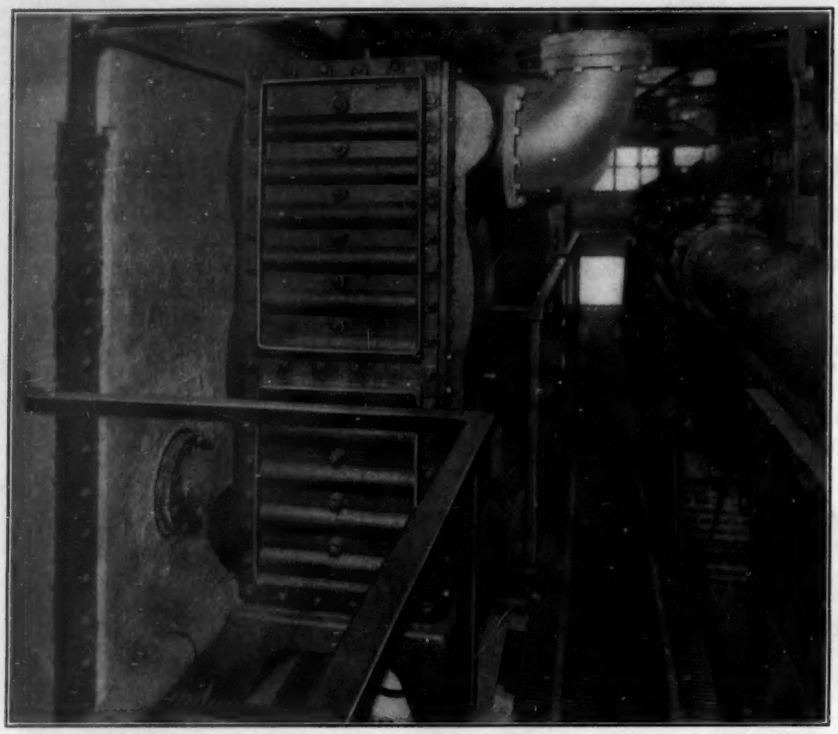


FIG. 2—ECONOMIZER FOR HEATING BOILER FEED WATER FROM GAS ENGINE EXHAUST

groups, the northern group consisting of the office building, service building, pattern storage and power house, while the southern group includes the machine shop, erecting shop, forge shop, oil house and pump house. Ample space has been provided for tripling the size of the machine shop and for erecting a foundry with a capacity of about 100 tons per day.

The plant has been laid out on rather conventional lines because the manufacturing processes do not permit elaborate specialization. Similar sized engines will have inter-changeable parts, but the designs are constantly being improved and the construction of special types to fit special conditions will form an appreciable part of the output. In other words, the plant will be operated along the lines followed by the early Corliss engine constructors, who were builders of high grade machinery rather than manufacturers. No money has been spared in the first cost of the shops and there is nothing temporary or transitory in the construction. The grounds have been carefully graded, leveled, rolled and sodded. The buildings are brick and steel of massive proportions. The ideal of permanency and durability is expressed in every detail.

The raw material storage, machine shop and erecting shop form virtually one structure. A 30-inch gage industrial railway and overhead traveling cranes connect all departments. The heavy raw materials enter the machine shop at the north where the heavier machine tools are grouped. From this point the work progresses through the shop to the erecting and testing floor at the south end. The small parts are manufactured on machines located on a gallery in the machine shop and are delivered to the erecting floor by an electric freight elevator and a dumb waiter. A special landing is also provided at the north end of the gallery for the delivery of material to the main traveling crane in the machine shop. Finished parts which are purchased in a manufactured state are stored on a gallery adjacent to the erecting floor.

The raw material storage yard at the north end of the machine shop is 210 feet long and 63 wide. The western end is completely enclosed and the northern side is sheltered for a distance of 63 feet. For the remaining distance of 147 feet, the northern side is open to the height of the crane rail, about 22 feet, and above this there is glass to the roof. The roof extends the entire length of the crane runway.

The concrete foundation walls of the machine shop extend 3 feet, 3 inches above the first floor line, forming a 2-inch water table. The brick work is of the same design on all the buildings; the color is a dark brown and the mortar joints are raked to a depth of about ⅜-inch, causing the bricks to be clearly defined. The top of the walls are capped with "algonite" coping and all the pilasters are 4 feet wide. The columns of all the buildings are spaced on 21-foot centers. The shop is 211 feet long between column centers and two bays wide, the machine bay being 64 feet and the balcony bay 42 feet. The bottom of

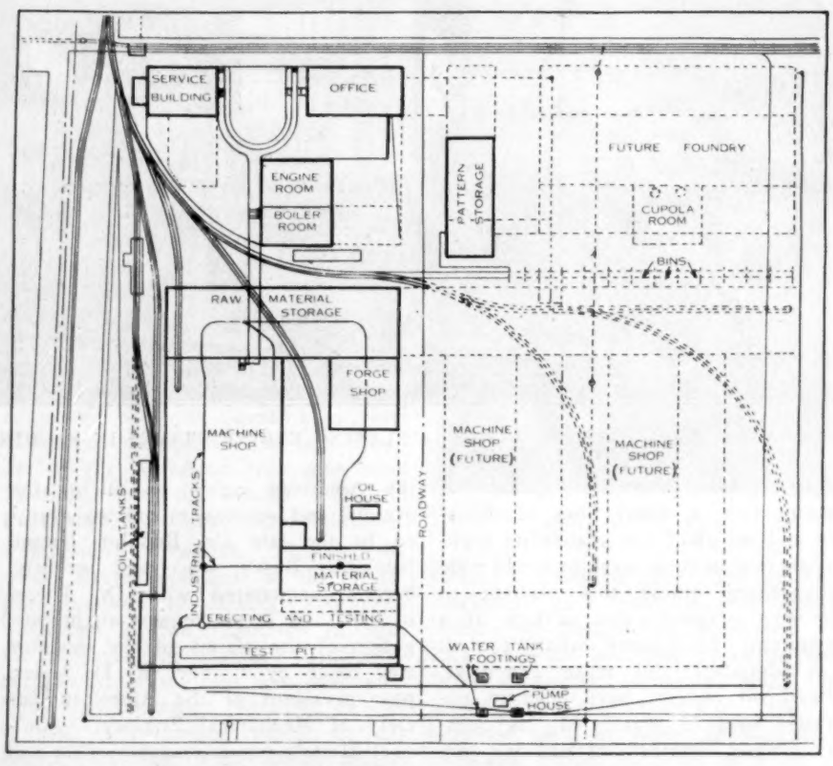


FIG. 3—GENERAL PLAN OF PLANT

the truss is 40 feet above the floor and the balcony floor is 26 feet above the main floor. The machine bay has a monitor 31 feet, 6 inches wide by 8 feet, 2 inches high, and the balcony bay monitor is 10 feet, 6 inches wide by 7 feet, 4 inches high. The finished material storage is 105 feet long by 42 feet wide and is three floors high. The erecting shop is 231 feet long between column centers and 63 feet wide. The bottom of the truss is 44 feet above the floor and the monitor is of the same dimensions as that of the machine bay. The east wall is temporary, built of asbestos covered with corrugated steel. The roofs are 1½-inch cement tile fastened to 9-inch I-beam purlins and covered with composition roofing. The main floor is concrete, 5 inches thick, and is finished with 1-inch asphalt in the erecting shop and with 3-inch creosoted blocks in the machine shop. A tar dressing has been placed over the wood blocks. The 4½-inch reinforced concrete floors of the second and third stories of the finished material storage have a cement finish and the balcony floor of the machine shop has a 1-inch asphalt finish. All the windows have United Steel sash and ribbed glass. The windows of the monitors are provided with continuous sash operators, while the main windows are operated in sections. There is a tool room on the main floor under the balcony and one on the balcony, the partitions being 8 feet high constructed of angle framing covered with sheet metal to a height of 4 feet, 6 inches; above this is wire mesh.

The erecting shop is provided with a test pit 12 feet wide, 199 feet long and about 3 feet, 6 inches deep. Along the entire length of the pit run two cast iron rails, to which the engines under test are attached. Along one side of the pit runs a 6-inch water main with 18 2½-inch outlets for connection to the water brakes and engine jackets. The outlet water drains into a 12-inch gutter which runs the full length of the pit and connects at the east end with an 8-inch pipe returning to the pump house sump. The exhaust gases from the engines are conducted to a concrete flue 4 feet, 2 inches high by 3 feet, 9 inches wide, running underground along the south wall of the erecting shop, parallel to the test pit. This flue terminates at the east end in a concrete fan house 14 feet, 3 inches long by 11 feet, 7 inches wide.

A motor-driven, 80-inch three-quarter housed Sturtevant fan exhausts the gas from the flue and discharges it up a 3-foot steel stack. The oil supply for testing the engines is drawn from three cylindrical tanks, each 8 feet, 6 inches in diameter by 29 feet, 6 inches long, and of 12,000 gallons capacity. These tanks are encased in concrete and set below the ground on the western side of the machine shop.

The machine shop and raw material storage are each equipped with a 30-ton electric traveling crane of 60-foot span, and the machine shop also has a 7½-ton crane with 39-foot span running underneath the balcony floor. The erecting shop has a 40-ton crane with a 60-foot span. These cranes were furnished by the Pawling & Harnischfeger Co., Milwaukee. The erecting shop is also provided with three 5-ton electric cranes built by the Whiting Foundry Equipment Co., Harvey, Ill. They travel along the south wall over the test pit and under the 40-ton crane. The finished material storage is provided with a 2-ton freight elevator. The machine and erecting shops have flaming arc lamps for general illumination with carbon drop lamps over the tools.

In equipping the shop, only tools

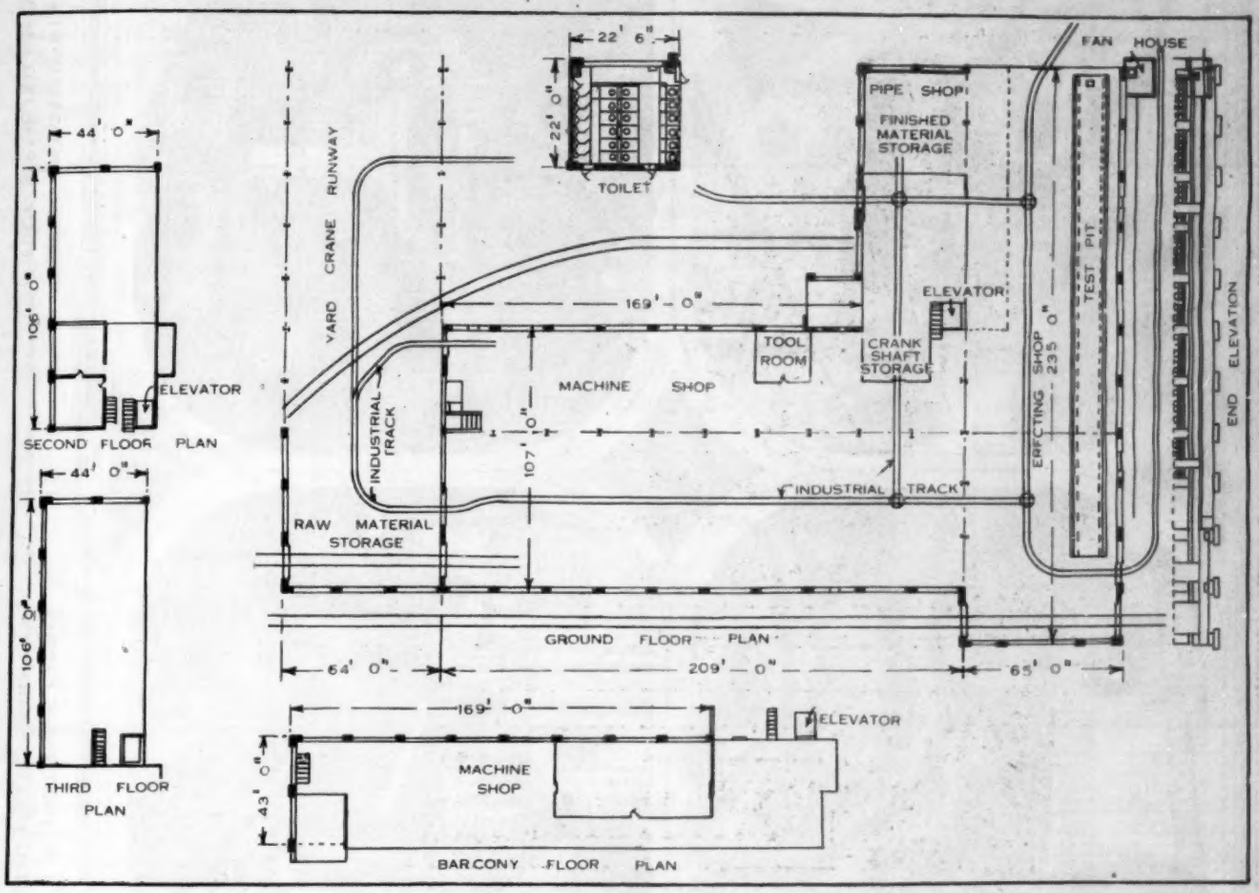


FIG. 4—PLAN OF MACHINE SHOP

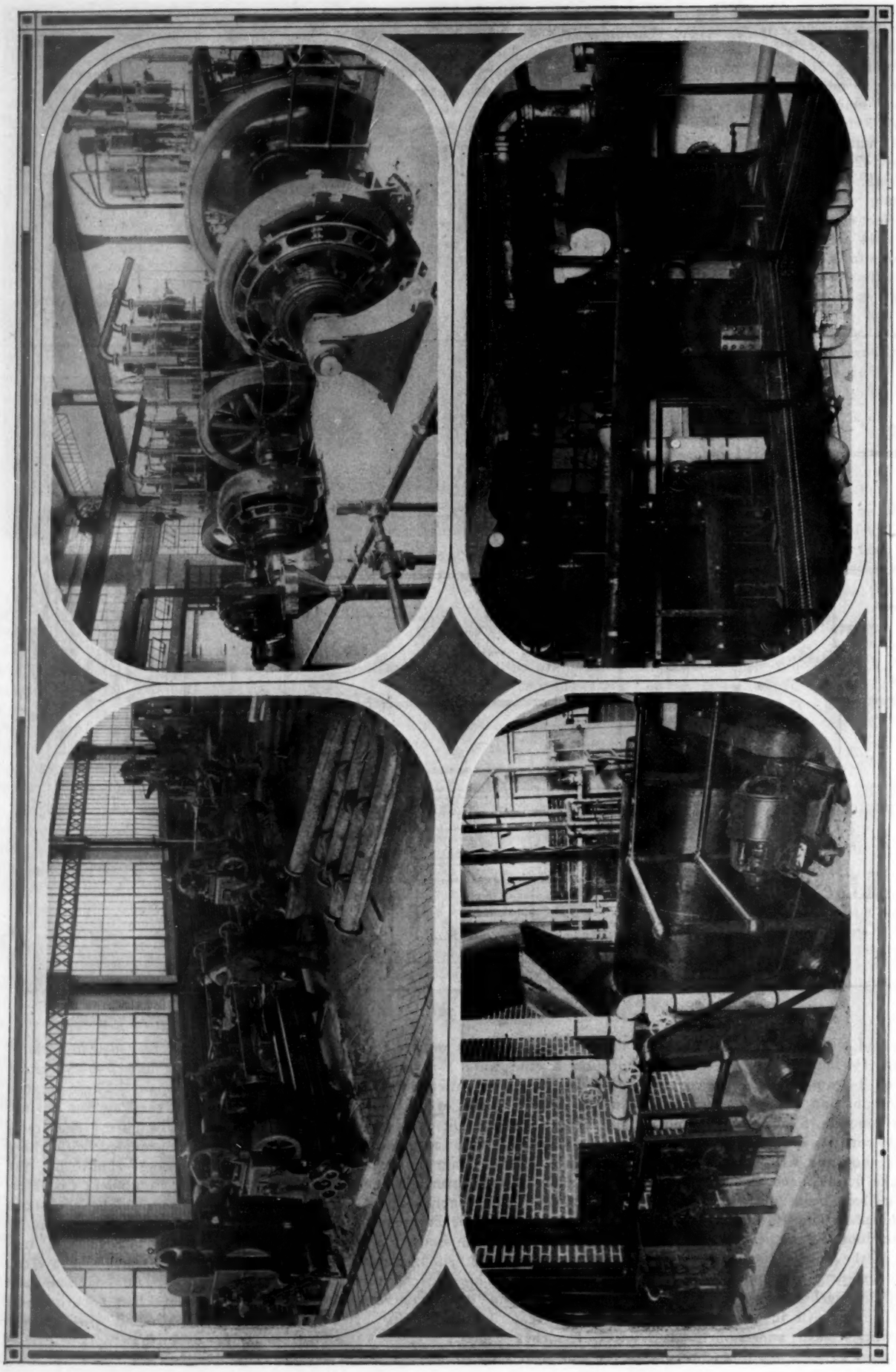


FIG. 5—TURNING CRANK SHAFTS ON MOTOR-DRIVEN LATHES
FIG. 7 — DEVICE FOR COOLING JACKET WATER

FIG. 6—VERTICAL 225-HORSEPOWER DIESEL ENGINES IN POWER HOUSE
FIG. 8—STEAM AND GAS FEED WATER HEATERS

of standard types were selected because of variations in the nature of the product. Every effort was made to obtain tools having the greatest efficiency and in numerous instances the individual tools are the first of their kind. All of the tools are driven by individual electric motors. This plan was followed in order to insure a maximum flexibility in operating the shop and also to make it easy to shift the tools around to meet new conditions of manufacture. Special arrangements have been made to insure the utmost accuracy in the machining operations. To this end a complete set of Swedish gages and Brown & Sharpe micrometers have been purchased. The tool equipment includes a large number of grinding machines with magnetic clutches permitting exceptionally accurate work. The production department will manufacture the various parts to pre-determined limits of accuracy and the erecting department inspects each piece before it is accepted. Rejected pieces are charged back against the production department. Experience has shown that success in Diesel engine construction depends to a large extent on careful manufacture, therefore a working limit of 0.0005 inch is set on small relatively unimportant bolts and the other parts are made with similar care. An important feature of the erecting department is a floor plate 27 feet wide and 54 feet long, so constructed that it can be shimmed up and re-aligned at any time.

The forge shop has a structural steel frame and is 66 x 65 feet outside the brick pilasters. The height to the bottom of the truss is 23 feet, and the monitor is of the same size as that over the erecting shop. The south wall is a temporary one, built of steel framing and asbestos-covered corrugated steel, similar to the east wall of the erecting shop. The floor is 8-inch tamped cinders and the roof is 1½-inch cement tile fastened to I-beam purlins and covered with composition roofing. The building is lighted by flaming arc lamps. The equipment is standard including furnaces furnished by the American Shop Equipment Co., Chicago.

The oil house is 26 x 12 feet outside the brick walls, which are 13 inches thick. The walls are built on a concrete base, with a 2-inch water table extending 18 inches above the ground. The gable roof, with a pitch of 1 in 12, is covered with cement plaster 3 inches thick overlaid with composition roofing. The roof rests upon concrete beams, the bottom of which are 8 feet, 9 inches above the floor. The 6-inch concrete floor drains toward a sump in the center. There is a steel door, 3 feet, 6 inches by 7 feet at the west end. At the northeast corner of the house is a pit 2½ feet square and 3 feet deep, in which are placed the pressure reducing valve and steam trap for supplying and draining the 1¼-inch pipe coil running along the floor and end walls. At the eastern end of the house is a fire extinguishing apparatus, consisting of a barrel of calcium carbonate with a bottle of sulphuric acid secured in the top. In case of fire a fusible link releases a rod which closes the vent in the roof and also breaks the acid bottle, thus causing the house to be filled with carbon dioxide.

The pattern storage building is 108 x 44 feet in size and consists of two stories and a basement. The frame work is of concrete with the Kahn system of reinforcing. It was designed by the Trussed Concrete Steel Co., Detroit. The exterior columns and beams are lined on the outside with brick. The floors and roof are of 6-inch concrete, the roof being designed as a future third floor of the building. It is covered with a cinder fill and composition roofing. The stairs are of reinforced concrete, the elevator shaft is of brick, and the toilet partitions are tile. The pattern shop is on the first floor and is equipped with a dust exhaust system. The tools are individually motor driven. Both floors and the basement are equipped with automatic sprinkling systems.

The office building is 188 x 44 feet outside and has three stories and a basement. The floors are constructed of hollow tile with 4-inch spaces of reinforced concrete, the sleepers and ¾-inch maple flooring being laid over the tile and concrete. The roof is tile, covered with cinder concrete and composition roofing. The main entrance to the building is at the west end. On the first floor is the administration department; on the second floor are the engineering and drafting departments, and on the third floor are the directors' room, reading room, dining room, toilets and blue print room. The building is provided with both direct and indirect lighting.

The service building is 66 x 44 feet outside and is two stories high. The one-story entrance at the west end is 24 feet, 8 inches by 11 feet, 6 inches, and is divided into a vestibule and gatekeeper's office. The framing is of

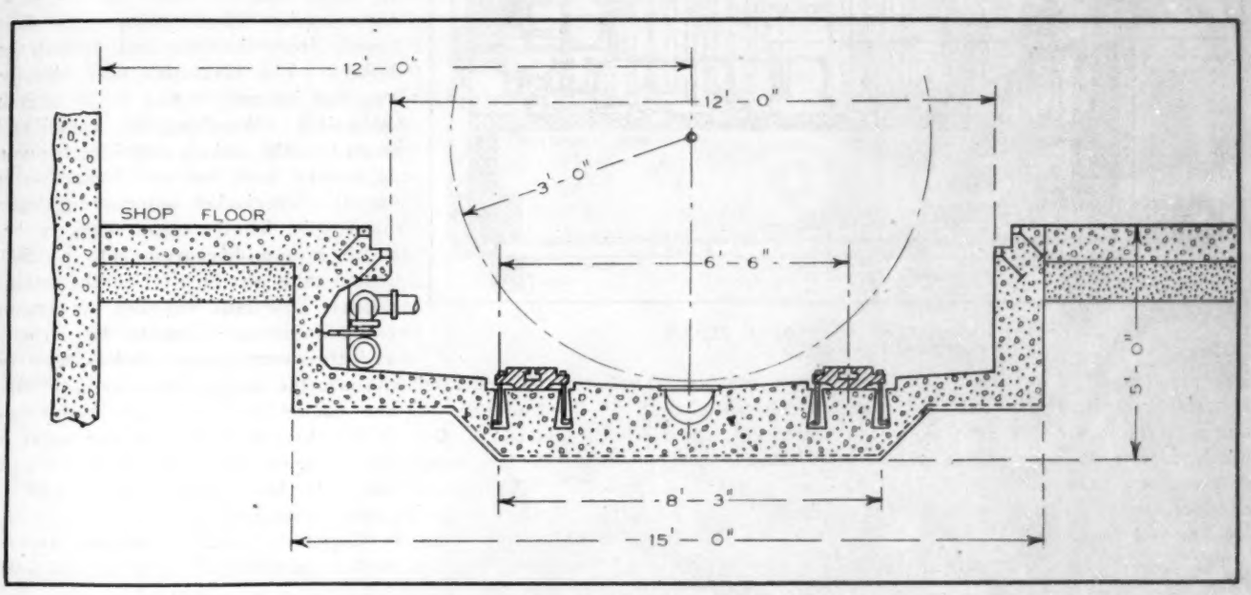


FIG. 9—CROSS SECTION OF TEST PIT

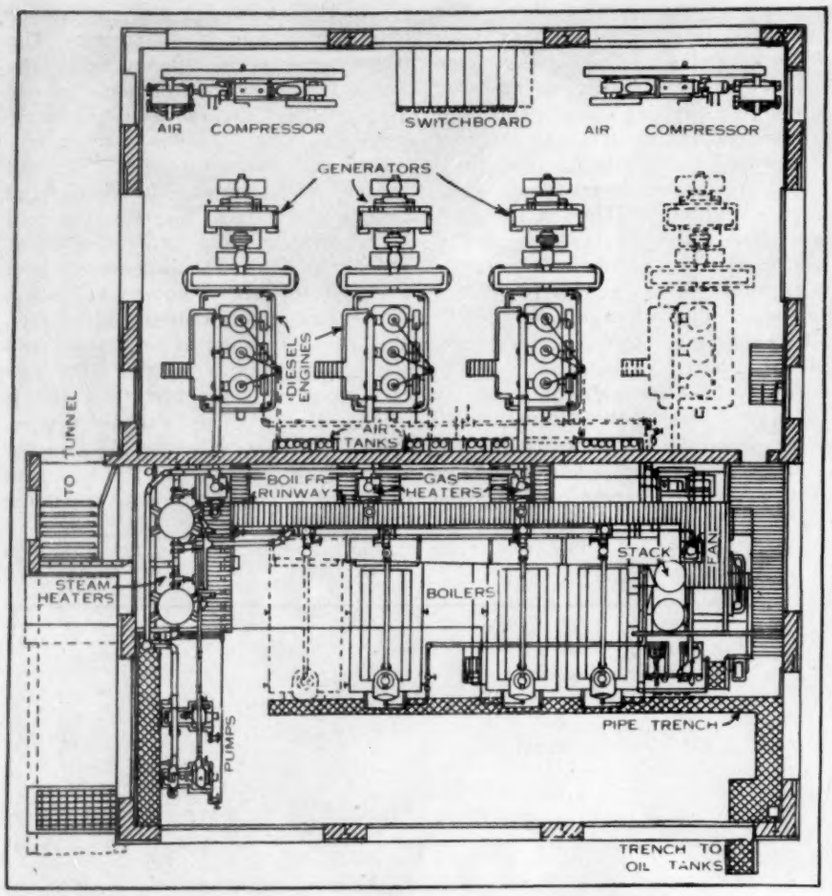


FIG. 10—PLAN OF POWER PLANT

structural steel. The first floor is of concrete and the second of hollow tile and concrete. On the first floor are the lavatories, lockers, toilets, showers and surgery. On the second floor is a lunch room and space for future lockers and lavatories.

The power house is 79 feet, 4 inches by 66 feet outside the brick work. It is divided into a boiler room, 63 feet by 35 feet, 3 inches, and an engine room, 63 x 40 feet. A plan and cross-section are shown in Figs. 10 and 11. The frame work is structural steel, the height to the bottom of the truss being 19 feet in the boiler room and 25 feet in the engine room. Most of the basement is occupied by the engine and compressor foundations. The brick piers shown in the drawings are temporary and support the floor over the future engine foundations. The floors are concrete and the roofs are cement tile covered with composition.

The steam boilers are used for supplying steam to the heating system, to the steam hammers in the forge shop and to some of the auxiliaries, while Diesel engines furnish power and light. Steam is furnished by three 100-horsepower oil-burning Heine boilers, using W. H. Best burners. The oil fuel for the burners is supplied from two 12,000-gallon tanks encased in concrete south of the building. A metering apparatus is placed in the southeast corner of the boiler room and another is placed in the engine room. The oil pipes from the meters run in a trench along the front of the boilers. A 3-inch water feed line above the boilers supplies 1½-inch connections at the front ends of the drums. The uptakes connect to a tapering steel breeching of rectangular cross-section, suspended from the trusses. The eastern end of the breeching is connected to a steam driven 80-inch steel plate Sturtevant exhaust fan, which discharges the flue gases up a 3-foot steel stack. The fan is set on a steel platform 12 feet, 3 inches above the floor. The 4-inch steam leads from the boilers connect through automatic stop and check valves and a gate valve to an 8-inch header.

Between the boilers and the eastern wall is a pit 4 feet deep, in which are placed the feed, lavatory and jacket pumps and the water cooler. The two steam pumps are of Worthington duplex type, 6 x 4 x 6 inches, both or either of which may be used for feeding the boilers. Normally one is used to supply the hot water for the lavatory service. Both pumps get their supply from the hot well behind the boilers. The lavatories may also be supplied by one of two motor driven 100-gallon Worthington centrifugal pumps. The other centrifugal pump is always used for the jacket water supply. The jacket water pump draws its supply from a sump directly beneath it and discharges into a 1,500-gallon tank on the roof of the engine room. This tank supplies the engine and compressor jackets by gravity and the warm water outlets may be run into the hot well or passed through the cooler and then into the sump. When there is a deficiency of water in the sump, a low level float valve in the roof tank allows city water to supply the jackets.

The two DeLaval steam turbine-driven centrifugal pumps for the heating system are located at the west end of the boiler room. They draw

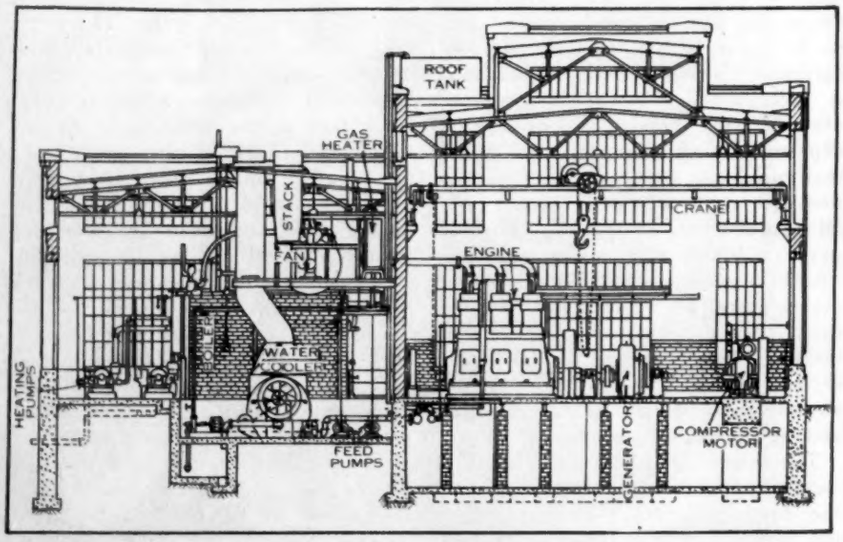


FIG. 11—CROSS SECTION OF POWER STATION

their supply from the 6-inch hot water return main. The three gas heaters are of cast iron, made by the Williams Tool Co. and are used for the purpose of extracting from the exhaust gases of the engines a portion of the heat usually lost. The 8-inch engine exhaust main enters at the bottom and leaves at the top, while the water enters at the top and leaves at the bottom, thus giving a counter-current effect. The condensation in the live steam headers is removed by a Gardner duplex pump and discharged into the boiler feed line through a check valve with a relief valve opening into the hot well. The exhaust steam from the heating system, boiler feed and drip pump is discharged into the hot well, with a back pressure valve into the atmosphere.

The engine room contains three main units, each consisting of a vertical three-cylinder 225-horsepower 4-cycle Diesel engine direct connected to a 160-kilowatt 115-230-volt, direct current Crocker-Wheeler generator, running 164 revolutions per minute. Each engine has the following connections: Two-inch jacket water supply, 4-inch warm water return, 1-inch starting air, ¾-inch air for injection and a ¾-inch oil supply from the auxiliary oil tank. The air for starting and injection is stored in seamless steel bottles by two three-stage Ingersoll-Rand air compressors each driven by a belt from a 50-horsepower direct current Crocker-Wheeler motor. The compressor cylinders are 10, 6½ and 3 inches in diameter by 12-inch stroke. The switchboard consists of seven panels, each 20 inches wide by 90 inches high. The machinery of the engine room is handled by a 10-ton hand-operated crane, with a span of 38 feet, 3 inches furnished by the Whiting Foundry Equipment Co., Harvey, Ill.

All the buildings are heated by the Evans-Almiral system of hot water heating. The 6-inch supply main from the power house divides into a 5-inch line which runs in a tunnel to the southern group of buildings, and into a 4-inch line which supplies the northern group. The supply and return for the machine and erecting shops are 5-inch, and the 15,720 square feet of radiation consists of coils of 1¼-inch pipe placed on the side and end walls and also overhead, below the trusses. The 1½-inch supply and return to the forge shop are carried in the trusses of the raw material storage crane runway, and the 800 square feet of the radiation consists of pipe coils on the walls of the shop. The office building has 2½-inch supply and return mains and 2,400 square feet of radiation consisting of pipe coils in the basement and radiators on the other floors. The service building has 2-inch supply and return mains and 1,120 square feet of radiation in pipe coils and a few radiators. The pattern storage building has 2½-inch supply and return mains and 1,980 square feet of radiation in pipe coils. The heating mains for the office, service and pattern storage buildings, are placed in ducts made of 18-inch split tile arched over a concrete base 5 inches thick. The 1½-inch heating pipes to the pump house connect with the erecting shop circuits and are placed in a 15-inch split tile duct.

Direct current is used for all power. The tools in the machine and erecting shops, forge shop and pattern shop are operated on three-wire, 110-220-volt circuits, while all the motors in the power house, the elevator in the office building and the elevator and cranes in the machine and erecting shop are operated on two-wire 220-volt circuits.

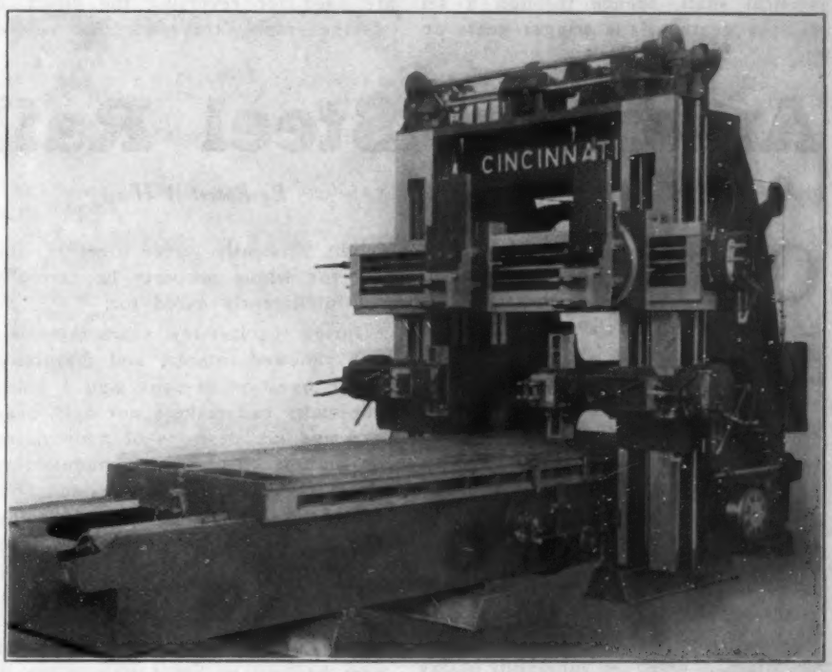
Both alternating and direct currents are used for lighting. The yard, tunnel and watchman's lights are on alternating current, two-wire, 110-volt circuits. All other lighting circuits are three-wire, 110-220-volts. Direct current is used in the machine, erecting and forge shops and pattern storage building, and alternating current in the power house, while either alternating or direct current may be used in the office and service buildings. The yard lighting consists of 100-watt tungsten lamps attached to

(*Continued on page 528b*)

Cost of Gas Cleaning

Tables recently prepared by A. N. Diehl show that the total cost of primary cleaning of 3,921,982,000 cubic feet of blast furnace gas in the year 1912 at the Duquesne plant of the Carnegie Steel Co. was $2,462,04. This includes the cost of water and electric power, labor, supplies, repairs, etc. Over 172 cubic feet of gas were cleaned per gallon of water and the cost per 100,000 cubic feet of gas was $0.06329. The cost per 1,000,000 British thermal units was $0.00657.

The cost of final cleaning of 804,322,000 cubic feet was $955.55. The Theisen washers consumed 15,043,000 gallons of water and 138,166 kilowatt hours of electricity. The cost of the water was $52.65 and of the electric current $538.54. The total cost of the final cleaning per 100,000 cubic feet of gas was $0.11856. Of this amount, labor costs absorbed 16.57 per cent; materials, 14.35 per cent, and electric current, 56.59 per cent. The cost per 1,000,000 British thermal units was $0.01237.



A PLANER ESPECIALLY EQUIPPED FOR MACHINING LOCOMOTIVE CYLINDERS

A Locomotive Cylinder Planer

A 72 x 72-inch planer for machining locomotive cylinders now is being built by the Cincinnati Planer Co., Cincinnati. As shown in the accompanying illustration, this machine has rapid power traverse to all heads in any direction and all movements are independent of each other and can be

effected whether the table is in motion or not. The top motor is used for driving the rapid power traverse and feeds to the head, and also for elevating and lowering the crossrail and the pump which lubricates the ways. The motor pinion engages a large gear on the horizontal rapid traverse shaft, from which the pinion that drives the feed clutch receives its power. Near the center of this horizontal shaft is shown a gear meshing into a pinion on the gear case of the elevating device through which power is transmitted for raising and lowering the crossrail.

The power feed to the heads is obtained from the driving clutch, which has a link motion to the bevel gear on the large horizontal shaft. This bevel gear meshes into a gear on the vertical shaft, thence through a set of spur gears to the trigger gears on the end of the rail and side heads. The driving clutch is tripped from a rod which receives its motion from the tumbler and dogs on the side of the table and bed. The amount of feed is varied by the graduated slot heads which indicate the exact amount of feed.

The rapid power traverse receives its power from a second vertical shaft on the side of the housing similar to the feed arrangement. The small handles shown on the end of the rail in the accompanying illustration on the side heads, operate the rapid traverse and feed. Turning these handles to the left engages the rapid traverse and to the right the feed, but in no case can both be engaged at the same time. The long handles at the back of the rail and side head are used for reversing the direction of the rapid traverse. An added feature of this machine are the extra side head supporters used while planing locomotive cylinders. The side heads are provided with extra brackets, which are bolted on the inside of the housing, and support the slides while planing the frame fits, etc. The brackets are adjustable in height, and can be used in any position between the top of the table and the bottom of the crossrail. A sliding shoe fits the front face of these brackets and is provided with a dovetail onto which is fitted the cross slide. This construction eliminates all twisting strains on the housing face, usually caused by the long overhung slide and the upward pressure of the tool. These brackets can easily be removed from the machine, thereby converting it into a standard planer. All of the gears are provided with guards.

American Steel Rail Situation

By Robert W Hunt

ONE of the most serious and important administrative problems facing American railway authorities today is that of their rails, and it is one to which much thought is being given, not only by the executive officers of the railways and the manufacturers of the steel rails, but also by state and national commissions. It is realized by many and admitted by some that the present situation is one which cannot be allowed to continue. The roadways of railways must be made more secure, or the weight of rolling stock and the speed of trains must be lessened; and the desired result must be attained with the minimum outlay of money, both in expenditure on plant and in cost of operation. If the investment per mile is too large, or through the lessening of tonnage and efficiency of equipment the cost of operation is too great, the desired and demanded cheap service cannot be rendered to the public. Therefore, the weight of equipment cannot be greatly reduced, and lessening the rapidity of service would be far from satisfactory; consequently, the safety of the roadway must be secured with the least practical outlay.

It is imperative that the roadbed should be properly graded, with the fewest possible curves, that it should have good ballast, be well drained, have good ties properly spaced, and be laid with sound rails of suitable weight, efficiently joined together, and that the whole property be carefully and intelligently cared for.

During the last few years there has been renewed interest and discussion of the question of rails, and I know that many rail makers not only have been and are desirous of maintaining the highest standards of manufacture which they may have attained, but have been and are seeking to better their product, in several instances devoting much time and money to that end. At the same time, they realize that the cost of any improvement in quality which they may accomplish must be kept within certain commercial bounds; this fact is as fully understood by their patrons as by themselves, and it should be kept in mind by all who discuss the question.

Table 1 contains a summarized statement of what may be called the mechanical practice of the steel-rail mills of the United States and Canada. It will be noted that the several works differ in their practice as to kind of steel, size of heats, size of ingots, kind of blooming and rail trains, number of passes in the rolls of both trains, and as to direct rolling into rails; practice in the finishing departments of the several mills also varies. In consequence of such variations, there are, of course, differences in the operating practice of the several plants. One thing that in my judgment has a great effect upon the quality of the product of all the mills is that the workmen are paid on a tonnage or piece basis, with, in some cases, an additional bonus based on quantity of product. Unfortunately, after the rails leave the works there is little chance of the identity of the workmen who made them being discovered. It is true that a number corresponding with that of the heat of steel from which they are rolled, and the month and year in which they are made, together with the name of the works, are branded on each rail, but to actually identify the steel maker who made the steel, the heater who heated it, the roller who rolled it, the shearman who cropped the blooms, etc., would be a complicated and practically impossible proposition. One result is that if, for any reason, such as delays from accidents to machinery, etc., the quantity of product is threatened, there is a temptation to in some way cut corners, the workmen knowing that if the rails are once out of the mill they need not worry over any individual responsibility.

In an endeavor to meet this and other phases of the situation, some two years ago I ventured the establishment of a system of more constant and thorough inspection of rail making than had been generally practiced. In this movement I received the support at first of several and later of many of the railroad companies of this continent, and I am happy to say that I have also received the loyal

Presented at the February meeting of the American Mining Engineers.

support of the officials of the several steel companies.

I have repeatedly shown that without sound ingots there will not be any certainty of producing sound rails; and that, as each ingot is an individual steel casting, some means should be adopted of testing for soundness the rails produced from each ingot. Until reliable ways of casting sound ingots are adopted, the importance of such testing should not be overlooked or underestimated. It is possible to make sound ingots. It will cost more than the present practice, but is that a good argument against it? Whether that increased cost should be added to the selling price of rails is a commercial question outside of the province of this paper. The increased cost of individual ingot testing is so small that it should not be a matter of much commercial importance.

Another feature of the situation which is receiving serious consideration is the desirability, if not the absolute necessity, of increasing the weight of rail sections. A number of such sections have been designed, and some have been rolled, and the rails are in use; but there is a metallurgical feature involved which should not be overlooked. The experience of many railways has been that their earlier rails, which were of lighter sections, gave better service than the later heavier ones, and the track men will tell you that when they cut one of the old rails they found a close, fine-grained structure, while the larger rails show a more or less coarse one. The old lighter rails permitted the fining effects of the rolling to penetrate, and, the mass of metal in their heads being comparatively small, the effect of the interior heat passed off sooner. The foregoing conditions result in the webs and flanges of all rails having a finer structure than their heads; therefore, as we increase the size of the rail section we will certainly decrease their proportionate strength, and under present manufac-

Table I.

AMERICAN RAIL MILL PRACTICE

Name of company. Name of works. Location.	No. of blast furnaces.	Rated produc. of each in 24 hrs., tons.	Bessemer converters. No.	Bessemer converters. Rated capacity each, tons.	Open hearth furnaces. No.	Open hearth furnaces. Rated capacity, each, tons.	Kind of steel made for rails	Nominal size of ingot molds. inches, Sect. at bottom,	Nominal size of ingot molds. inches, Height.	Nominal No. ingots per heat, Bess.	Nominal No. ingots per heat, O. H.	Nominal soaking pit capacity, No. of ingots.	Type of blooming mill. (d)	No. passes given to ingot in blooming mill.	Nominal sect. size of bloom made, in.	Blooms reheated.	No. passes in rail mill.	Nominal No. passes ingot to rail, min.	Max.
Algoma Steel Co., Algoma, Soo, Ont., Can.	3	2–300 1–400	2	5	5	35	Bess. & O. H.	18x19	72	2	18	96	2 High Revers'g	15–17	8 x 8	Yes	11	26	28
Bethlehem Steel Co., Saucon, So. Bethlehem, Pa.	6	2–200 4–450	2	25	10 6	50 75	O. H. (straight & Duplex)	19x23	72	.	24	120	2 High Revers'g	13–15	8 x 8	No	11	24	26
Cambria Steel Co., Cambria, Johnstown, Pa.	8	4–400 4–300	4	12	28	50–100	Bess. & O. H.	20x23 23x29	78 78	4 4	16–24	140–1 Mill 180–1 Mill	3-2 High Rev. 1-3 High	14–28	9 x 10	Yes	12	26	40
Carnegie Steel Co., Edgar Thomson, Braddock, Pa.	11	500	4	15	14(a)	75	Bess. & O. H.	18½x19½	71	7	40	160	3 High	7	9¾ x 9¾	Yes	13	20	20
Carnegie Steel Co., Ohio, Youngstown, Pa.	6	500	2	12	12	75	Open Hearth	19x21	74	.	26	144	3 High	9	8 x 8	No	11	20	20
Colorado Fuel & Iron Co. Minnequa, Pueblo, Col.	6	2–250 4–425	2	10	12	65	Open Hearth	18x20	67	.	30	144	2 High Rev.	13–17	8 x 8	No(k)	10	23	27
Dominion Iron & St'l, Dominion, Sydney, N. S., Can.	6	250	3	18	10	50	O. H. (straight or duplex)	18½x21½	82	.	18	90	2 High Rev.	13–19	8 x 8	No(k)	11	24	30
Illinois Steel Co., Gary, Gary, Ind.	8	400	None	None	28 14	80 100	Open Hearth	20x24	79	.	24	192	4 Sets 2 High 1 Set 3 High	9	8 x 8	No	9	18	18
Illinois Steel Co., South, So. Chicago, Ill.	11	500	3	15	26(c)	50	Bess. (or Elec.)	18x19½	67	7	..	168	3 High	9	8 x 8	No	9	18	18
Lackawanna Steel Co., Lackawanna, Buffalo, N. Y.	7	500	4	15	14 2	60–90 200(b)	Bess. & O. H. (straight or duplex)	19x19	72	6	34	120	2 Sets 2 High 1 Set 2 High Rv.	6	8 x 8	No	9	15	15
Maryland Steel Co., Maryland, Sparrows Pt., Md.	4	300	3	15	5	60	Bess. & O. H. (straight or duplex)	20x21	66	6	22	108	2 High Revers'g	13–17	8 x 8	No	11	24	28
Monterey Iron & St'l Co., Monterey, Monterey, Mex.	1	350	1	10	4	30	Open Hearth	19x22	66	.	16	72	2 High Revers'g	15	8 x 8	Yes	10	25	25
National Tube Co., Lorain, Lorain, O.	5	500	2	15	6	80	Open Hearth	22x26	72	.	22	64	2 High Revers'g	21–25	various(e)	Yes	11(f)	32	36
Pa. Steel Co., Pennsylvania, Steelton, Pa.	5	2–200 2–460 1–500	3	15	5 2 2 6	75 50 30 60	Bess. & O. H. (straight & duplex)	19x19	74	.	30	60	3 High	9	various(e)	Yes	11(f)	20	20
Tenn. Coal, Iron & R. R. Co., Ensley, Ensley, Ala.	6	350	2	25	8	100	O. H. (duplex)	23x23	79	.	30	144	2 High Revers'g	11–15	8 x 8	No(k)	10	21	25

(a)—Including those in process of construction.
(b)—Continuous Talbot process furnaces giving 100 ton heats.
(c)—Also one Heroult electric furnace of 15 tons capacity.
(d)—Unless otherwise stated mills are non-reversing and have fixed distance between rolls.
(e)—Varies according to section of rail being rolled.
(f)—For Standard T rails.
(k)—Some blooms may be re-heated.

turing conditions the heavier rails will have less resistance to the abrasive wear of the traffic.

Excepting in the ability to roll rails by the use of fewer passes in the rolls, and to handle the operations mechanically and automatically, there have not been any radical changes in rail rolling for many years. The plan of rolling reductions has remained much the same. Some experiments have been made and various schemes have been proposed, but none of them are in active use. In my judgment, the present situation demands serious consideration, even though it should require very radical changes in the rolling machinery of the existing rail mills. If we must have rails with more metal in their heads, as well as thicker webs and flanges, it is most important that the work of reduction and formation from the 8 x 8-inch blooms shall be applied in a way to penetrate and fine the metal in the real heads. I shall not attempt to particularize the method, but no doubt a modification of the universal mill will suggest itself as one possible way, and I know of several schemes which contemplate putting work on the top of the heads in addition to only the sides, as is the case with the present mills.

New Vermillion Mines

It is expected that three mines will be added to the Vermillion range shipping list the coming season. The Consolidated Vermillion Co. has development work well under way in Sections 4 and 5, township 64, range 14, and is stockpiling. Conditions at the Lucky Boy property, south of Ely, are similar. Development work is in progress at the North American tract, near Tower Junction, the third prospective shipper. Geo. A. St. Clair has been shipping from his Section 30 mine during the winter, the ore going principally to the Zenith Furnace Co., Duluth. The Section 30 output in 1913 was 163,000 tons.

Although Ohio suffered from a number of untoward influences during 1913, the production of coal in that state was slightly in excess of the output in the preceding year, but it amounted to a little over 34,500,000 short tons. In the late spring the mining operations were adversely affected by the unprecedented flood which tied up transportation and put the coal mines out of business for about one month. Later in the year, as if to make up for the excess of water during the spring, the Ohio valley region was seriously crippled by drought, and the water supply in Ohio was deficient during September, October and November.

The Knox Pressed & Welded Steel Co., Pittsburgh, is sending to the trade a circular describing the Walker pulverized coal controller which this company now manufactures and which has been in successful use for 14 years at the plant of the Erie Malleable Iron Co., Erie, Pa. This controller has a capacity for feeding 1,200 pounds of pulverized coal per hour, air being employed at a pressure of 80 pounds and only 15 cubic feet of free air per minute being required for the amount of coal noted. This controller is built in capacities to handle from 25 to 1,200 pounds of pulverized coal per hour.

The production of tin in the United States is insignificant compared with that of the great tin mining regions, such as the Federated Malay States, Bolivia and Australia, but a small output amounting to an equivalent of about 50 short tons of metallic tin was made from five localities during 1913. Three of the producing localities were in Alaska and one each in South Dakota and South Carolina.

Table II.

AMERICAN RAIL MILL PRACTICE

Name of company.	No. hot saws generally used.	Distance nearest hot saw ($_g$) from finishing pass, ft.	Av. time, sec., bet. 1st rail leav. fin. pass and being sawed.	Brand on top or bot. side web as rolled.	Brand on rail reads fr. -to- of ingot as roll'd		For 100-lb rail: No. blooms cut per ingot.	For 100-lb rail: No. rails made from each bloom.	For 100-lb rail: Total No. rails per ingot.	For 100-lb rail: Nom. shrink. per 33 ft. rail, in.	For 90-lb. rail: No. blooms cut per ingot.	For 90-lb. rail: No. rails made from each bloom.	For 90-lb. rail: Total No. rails per ingot.	For 90-lb. rail: Nom. shrink. per 33 ft. rail, in.	For 80-lb. rail: No. blooms cut per ingot.	For 80-lb. rail: No. rails made from each bloom.	For 80-lb. rail: Total No. rails per ingot.	For 80-lb. rail: Nom. shrink. per 33 ft. rail, in.	No. of hot beds used.	Are rails turned over on hot bed when cooling?	No. of rails each normally holds.	Are rails pull'd up on hot beds head first or base first?	No. cold straighten'g presses.	No. pairs of drills.
Algoma Steel Co.	1	120	30	Bot.	Top	Bot.	2	2	4	6¾	.	.	.	...	2	3in1 2in1	5	6½	2	Yes	65	Head	5	5
Bethlehem Steel Co.	1	211	33	Bot.	Bot.	Top	2	3	6	6⅜	2	4in1 3in1	7	6¼	2	4	8	6⅛	6	Yes	90	Base	6	6
Cambria Steel Co.	4	79	30	Bot.	May be either		Various depending on size of ingot												4(h)	Yes	70	Head	8	4
Carnegie Steel Co.	4	43	15	Bot.	Bot.	Top	2	2in1 1in1	3	6¾	1	3	3	6⅝	2	2	4	6½	4	Yes	85	Base	12	12
Carnegie Steel Co.	3	122	25	Bot.	Bot.	Top	2	2	4	6¾	2	2	4	6⅝	2	3in1 2in1	5	6½	2	Yes	70	Base	6	6
Colorado Fuel & Iron Co.	1	108	26	Bot.	Bot.	Top	2	2	4	7	2	2	4	6⅞	2	2	4	6¾	3	Yes	60	Head	6	6
Dominion Iron & Steel Co.	1	107	25	Bot.	Top	Bot.	2	2in1 3in1	5	6¾	2	2in1 3in1	5	6⅞	2	3	6	6⅜	2	Yes	170	Head	4	4
Illinois Steel Co.	5	158	29	Bot.	Bot.	Top	2	3	6	6⅝	2	3in1 4in1	7	6½	2	4	8	6¼	6	Yes	80	Base	16	16
Illinois Steel Co.	5	60	25	Bot.	Bot.	Top	1	3	3	6¾	1	4	4	6⅝	1	4	4	6½	3	Yes	90	Head	16	16
Lackawanna Steel Co.	1	270	24	Bot.	Top	Bot.	1	4	4	6½	1	4	4	6⅜	1	5	5	6¼	4	Yes	120	Both	12	12
Maryland Steel Co.	1	158	32	Bot.	Bot.	Top	2	2	4	6¾	2	2in1 3in1	5	6⅝	2	2in1 3in1	5	6½	6	No	150	Head	7	7
Monterey Iron & Steel Co.	1	205	40	Bot.	Top	Bot.			.	...	.	.	.	...	.	.	.	...	2	Yes	60	Head	3	3
National Tube Co.	2	123	26	Top	Bot.	Top	3	2	6	6½	3	2	6	6½	4	2	8	6⅜	4	No	120	Both	12(i)	11
Penn. Steel Co.	2	8	24	Top	Top	Bot.	2	2	4	6¾	2	2	4	6⅝	3	2	6	6½	4	Yes	70	Both	4	6
Tenn. Coal, Iron & R. R. Co.	4	120	25	Bot.	Top	Bot.	.	.	.	...	3	3in2 2in1	8	6⅞	3	3	9	6¾	4	Yes	75	Head	10	10

(g)—Or one commonly used.
(h)—Not protected by roof from weather.
(i)—Including 4 automatic machines.

Pittsburgh Screw and Bolt Plant

Details of a compactly arranged shop equipped with motor driven machinery and gas furnaces

FROM the standpoint of manufacturing efficiency and economy, as shown by the arrangement of the machinery, the routing of the work, the application of power, etc., there has been great improvement of late years in bolt, screw and nut plants, and some of those recently erected have aided in putting that industry on a high plane of production as compared with many other lines of metal-working.

Among the new plants laid out on modern lines is one just completed by the Pittsburgh Screw & Bolt Co. on the former site of the Riter-Conley Mfg. Co.'s works in Pittsburgh. The plans for this were made and the erection of the equipment supervised by William G. Costin, president of the company, who had a similar experience last year in the construction of the plant at Gary, Ind., controlled by the same interests.

The Pittsburgh plant, which alone has a capacity of 60,000 tons of finished products yearly, is equipped for the manufacture of a very complete line, including machine bolts, carriage bolts, blank bolts, rough and milled stud bolts, staybolts, foundation bolts, patch bolts, coupling bolts, hanger bolts, turned and finished bolts, bolt ends, cone and gimlet point lag screws, set and cap screws of every description, boiler and structural rivets, truss rods, bridge rods, upset rods, hot and cold pressed nuts, semi-finished nuts, as well as finished and case-hardened nuts.

From the foregoing the reader will have an idea of the large and varied equipment necessary. The shop is 850 feet long by 350 feet wide; the walls are of brick with interior columns, girders and crane runways of the usual steel construction. All of the flooring is 6½-inch concrete aggregating 255,000 square feet in area. Spur tracks from the Pennsylvania and Baltimore & Ohio railroads enter the shop; one set of tracks is used for incoming material and the other for outbound shipments. All of the bar and rod stock for bolts, screws, rivets and nuts is transferred in bundles or coils directly from incoming freight cars to a receiving space, or to racks located in front of the machines in which it is to be used. Rivet stock is taken as needed directly to the shears or to the continuous feed machines and after the roughing stage, passes in a straight line across the plant through the various finishing processes to the inspection and packing floors. The shipping platform forms merely a continuation of these floors, and from it the filled kegs are rolled directly into cars lined up at the side or to motor trucks at one end. In connection with the routing of the work it should be added that all of the shears and heading or nut-making machines used for standard products are located at car floor height on a level above that of the remainder of the plant. This facilitates the handling of stock from the unloading track and forms aisles at the regular floor level between the rows of machines, into which the bolts, nuts and rivets in the rough are discharged. There is also the advantage of having the skilled machine operators working on one level and the laborers on another. The finished bolts or rivets are removed from the machine aisles in wheelbarrows.

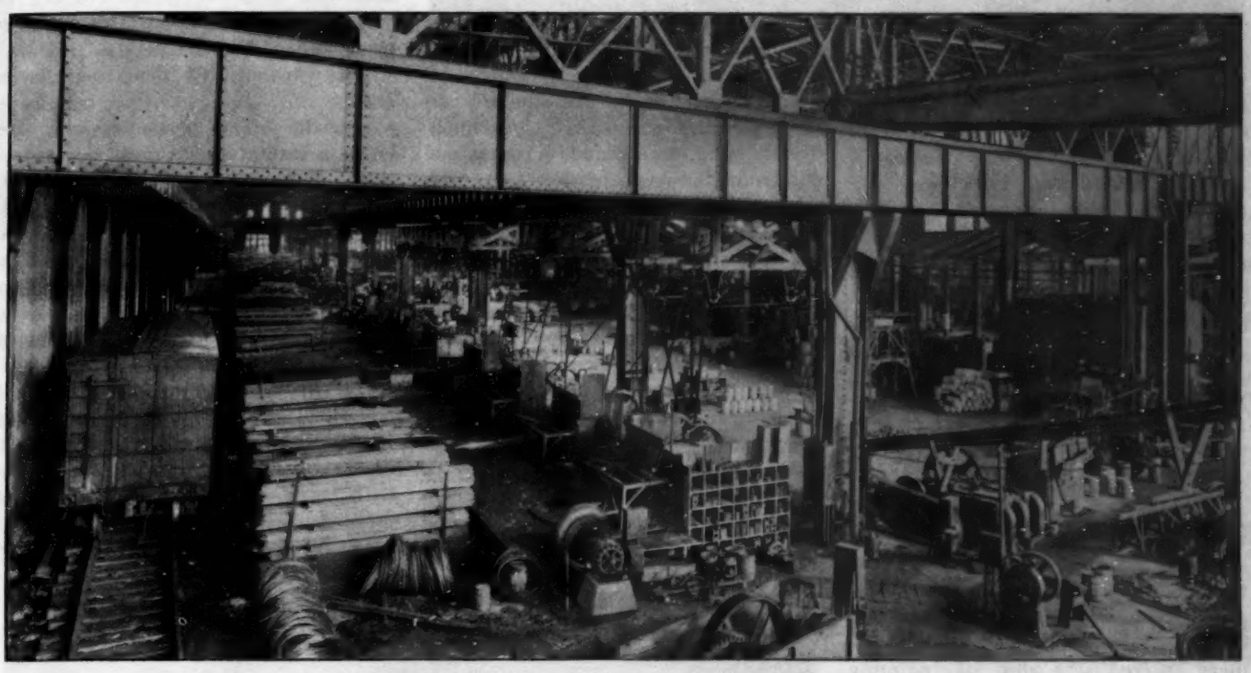


FIG. 1—RIVET FORGING DEPARTMENT OF PITTSBURGH SCREW & BOLT CO.

For all of the standard work in the screw department, four and five spindle continuous screw machines are used. Special work is handled on semi-automatic turret lathes. All of the machines are driven either by individual motors or in small groups, depending on the size of the machine. After the material has passed through these machines it is taken to the grinding, polishing and buffing department, which is located next to the screw department. It is equipped with a dust removal system, which includes a suction blower for carrying the emery and dust into a tank of water. Other special work such as

FIG. 2—PACKING AND SHIPPING DEPARTMENT

slotting, milling and case hardening, is also done in the grinding and polishing department, which is accessible to the shipping department.

Hot Bolt Department

In the hot bolt department, as well as in others, the raw material is located immediately behind the shears, each size of material being placed near a shear of suitable capacity. All of the machines are elevated so that the material is carried by gravity to tote boxes in which it is removed to other departments. The various types of heading machines are individually motor-driven, and the blast for the specially designed burners in the gas furnace is furnished by a high pressure blower which is also motor-driven. Just beyond the heading department there is a row of pointing benches from which the material is delivered to an hydraulic elevator operated by 80 pounds water pressure from a standpipe. The water is fed into the standpipe by two centrifugal motor-driven well pumps. Beyond the pointers are the threaders, from which the work is carried into the packing department.

The cold bolt department is arranged in a manner similar to the other departments, the trimming presses and annealing furnaces being between the cold headers and the pointers. All of the cold heading machines are individually motor-driven with the exception of a double row of small headers which are driven in a group with one large motor.

The hot pressed nut, cold pressed nut, cold rivet, hot rivet and upset heading departments are similarly arranged with motor-driven machines. The tapping, facing and finishing machines are situated between the foregoing departments and the shipping room.

The main tool room is in the central portion of the shop, where it is convenient to all departments, but smaller tool rooms equipped with a few lathes, drill presses, shapers and milling machines are located in each department for handling routine work. Adjacent to the tool room is a forge shop containing the usual array of steam hammers and furnaces, which are used for special forgings, as well as for the manufacture of tools. Fuel oil is stored in an underground reservoir and there is also an outside buried tank for gasoline used by the company's motor trucks. The threading, lard, carbon and motor oils are kept on the floor of the plant in conveniently placed steel tanks. Soda tanks containing the cutting mixture for the tools are placed at intervals along the several lines of machines.

Lighting

The light throughout the shop is good both by night and day. Artificial illumination is furnished by Cooper-Hewitt quartz arc lights so arranged as to give a uniform distribution of light throughout the building. These lights are hung at a height of 40 feet each and each one illuminates approximately 4,500 square feet. No individual lamps are used over the machines, resulting in an absence of the glare and shadows noticeable in many other shops.

The work of each department is in charge of a foreman who has made a specialty of his particular line. He keeps a careful watch on every operation. This not only enables a high standard of quality to be maintained, but also contributes largely to the operating efficiency of every unit. The foreman of each department has a conveniently located office where he can keep his records and orders and give suitable direction to the work. All of the work is inspected before it is packed and rejections are sent to the scrap yard. Bolt and nut threads, in each instance, are tried by mating with standard counterparts. By this method, claims from customers on account of defective workmanship are

FIG. 3—WIRE DRAWING AND FORGING DEPARTMENT

reduced to a minimum. Possible defects due to structural weakness in the material or from ill-advised heat treatment are, of course, guarded against by physical and chemical tests of samples taken from each lot.

Electric Power

Electric power is used throughout the plant. It is brought in at high potential to a sub-station in the center of the plant and there reduced to operating pressures, being stepped down in three transformers from 11,000 volts to 440 volts for the motors and from 11,000 volts to 220 volts for lighting.

Most of the motors are alternating current machines, three phase, 60-cycle, of the squirrel cage induction type, but the motors operating cranes, hoists, elevators, etc., use continuous current. To supply these, there is a motor generator set in the sub-station consisting of a 100-kilowatt, 240-volt, continuous current generator driven by a 150-horsepower, 440-volt induction motor provided with a starting compensator. There is also a multi-panel switchboard, with the necessary indicating and recording instruments, and the system has modern protective devices, including lightning arresters. The electric current is distributed through wires laid in conduits through the concrete floor and operating platforms.

Special attention has been given to the sanitary features of the plant. The building is well lighted and ventilated, and drinking water is provided by bubbling fountains scattered throughout the shop. When operating at capacity, the plant employs between 900 and 1,000 men.

FIG. 5—COLD BOLT HEADING MACHINES

Cuyuna Activities

The fact that the Soo line has ordered 1,000 ore cars for hauling ore next season and the further news that the Northern Pacific railway has placed an order for 250 all-steel ore cars, indicate that the railways will keep pace with the increased production on the Cuyuna iron range. Mines shipping on the Soo will be the Kennedy at Cuyuna, the Armour No. 2 and Armour No. 1 at Crosby, the Pennington pit, the Thompson pit, the Rowe pit, the Iron Mountain and possibly the Meacham. Shipping over Northern Pacific lines will be the Adams at Oreland, the Cuyuna-Duluth at Ironton, Cuyuna-Mille Lacs near Ironton, the Duluth-Brainerd near Steelton, the Brainerd-Cuyuna at Brainerd, the Barrows at Barrows, and the Canadian-Cuyuna at Loerch, if the last named mine can be gotten in shape to ship that early. Northern Pacific surveyors are running a spur from the main line at Loerch to the Canadian-Cuyuna Ore Co. mine six miles east of Brainerd.

The Armour No. 2 mine at Crosby has increased its crew. Day and night shifts are at work and the ore in stockpile is about 10,000 tons. At the Kennedy mine at Cuyuna there is about 75,000 tons in stockpile. The Adams mine at Oreland has 500 tons in stockpile. The Rowe pit mine will install a lot of new electrical equipment for pumping and hydraulic work.

The Northern Pacific railway is calling for bids at St. Paul to grade the extension from the Cuyuna-Mille Lacs mine to the Duluth-Brainerd mine in section 32, township 47, range 29. The road must be completed by June 30 when the mine is expected to ship. The Northern Pacific will also build a spur from its main line to the Canadian-Cuyuna Ore Co., a mile south of Loerch and six miles east of Brainerd. Mines on the Cuyuna range now stockpiling are the Kennedy at Cuyuna, Armour No. 2 at Crosby, Adams at Oreland, Barrows at Barrows, Cuyuna-Mille Lacs near Steelton, and Cuyuna-Duluth at Ironton.

FIG. 4—COLD PUNCHED NUT DEPARTMENT

The Skinner Chuck Co., New Britain, Conn., is about to erect a four-story brick building, 50 x 154 feet in Church street, that city.

Keeping Your Furnace Gas Clean

How to test washed blast furnace gas—Tables showing the economy of clean gas

Interesting details regarding methods of testing the gas washing and cleaning apparatus connected with blast furnace plants and the economy of using clean gas are given in a paper by A. N. Diehl, read before the February, 1914, meeting of the American Institute of Mining Engineers. Portions of this paper are reprinted herewith. The tests described were made at the Duquesne plant of the Carnegie Steel Co.

AN AVERAGE sample of the gas delivered to the gas engines is drawn over a period of 7 hours each day. This is transmitted to the laboratory for analysis, which is reported back along with the calculated heat value in terms of net B. T. U. per cubic foot at 62 degrees Fahr. and 30 inches of mercury.

Conducting and Reporting Tests

In conducting and reporting the various tests, we have endeavored to follow a standard method of procedure and form. A complete scrubber test, consisting of 71 items, is shown in Table I. This manner of reporting such tests and the data shown, seem to cover pretty thoroughly the performance of the unit, including those items of observation which are of paramount importance, and we have found it most valuable.

Some such method should be pursued in making all washer tests at various plants and it is suggested a form similar to the one here shown be adopted. It would be of considerable advantage to have all tests reported in such a manner that they become comparative, which, of course, was our primary object in this case.

There is also a standard form for reporting dust and moisture determinations on engine gas.

Until within the last six or seven months, all moisture and dust determinations were made with the Brady apparatus. We found that the results on dirty gas could not be depended upon and were very inconsistent at times, and therefore adopted a method of dust estimation in dirty gas. On clean gas, however, the results obtained by the use of the Brady apparatus are sufficiently reliable for all practical purposes. We are using the apparatus as originally designed, but we understand that it has since been considerably improved and that more reliable and accurate determinations are possible. Some few months ago a number of determinations of dust and moisture, Table II, were made with the Brown apparatus, the results of which indicated accuracy and reliability. On engine gas we seem to get very good results with the Brady apparatus, encountering very little difficulty and inconvenience in manipulation, at the same time taking every precaution to minimize error.

In making dust and moisture determinations, it has been our aim to sample the gas at the same velocity as the gas flowing in the mains. With our present Brady apparatus, we find this a little tedious on clean gas to stoves and boilers, requiring constant attention and adjustment on the part of the observer. However, on engine gas we encounter very little inconvenience from this source and have been able to maintain the proper velocity with comparative ease.

The first dust and moisture determinations were made using volumetric tanks in determining gas volumes, which we found to be very inconvenient and decidedly limited. These we have replaced by wet test meters and as a result have sampled as much as 500 cubic feet during a single test.

We have not made regular or daily determinations of dust and moisture, since we have not been inconvenienced by excessive dust deposition, either in our clean mains or the engine cylinders. Tests indicate a very uniform dust content in clean gas, with the moisture practically corresponding to saturation at the off-coming gas temperatures, and at no time have we encountered mechanically entrained water in amounts to be detrimental.

The Use of Raw Gas

The use of raw gas in stoves is conductive to low efficiencies. This is due primarily to the heavy coating of dust on the brickwork fusing in masses, thus preventing the absorption of heat, destroying the brickwork, and requiring constant attention to the removal of this material. During the periods of scraping out the combustion chamber, the stoves are burning gas very inefficiently, and at such times as the stove is off for complete cleaning the furnace is deprived of one-fourth of its blast heating capacity. The intermittent pressures also make it impossible to obtain a constant flue-gas analysis and allow either excess air or gas in the stack.

The use of raw gas in the boilers shows a similar low efficiency, but not so marked. It is customary to blow off the tubes every 24 hours, and while the blowing is going on much excess air enters the combustion chamber. From the time the tubes are cleaned they start collecting dirt again and the steaming power suffers accordingly. Intermittent pressure also affects the boiler flue-gas analyses as in the stoves.

The Use of Clean Gas

By the use of clean gas in the stoves we completely do away with cleaning stoves, have a constant pressure in the gas supply, and use an orifice plate over the air-inlet door, which gives us an extremely constant and economical flue-gas. The saving on clean gas over dirty gas on stoves amounts to 0.1591 cents per ton of iron. The use of clean gas in the boilers gives the same benefits in operation.

The thoroughly cleaned gas is used only for engine purposes. Within a few hours after starting, all exposed parts inside of the cylinders except the wearing surface become coated with a light brown deposit. It has been our experience that if oil can be kept away from these surfaces this deposit is only very slightly increased by further operation of the engines. In the combustion chambers, where there is never any oil present, the deposit is so even that we have operated cylinders for nearly four years without cleaning these surfaces, and consider that the presence of such an even coating is an advantage, having an insulating effect, and protecting the metal from the direct action of the hot gases. However, where an excess of oil is present, as on the inside of

the cylinder head directly below the piston rod (the oil being carried in by the rod), the dirt accumulates more rapidly and often very unevenly. If an engine is shut down and the head allowed to cool, then started and brought up to working temperature again, the contraction and expansion of the head breaks the accumulated oil and dirt loose in the form of scale or blisters, the edges of which are easily heated and cause premature explosions. Usually this scale will partly break off, due to these premature explosions, and trouble at this point usually ceases until the next time the engine is stopped and started. When this trouble occurs too frequently, the engine is shut down, the cylinder examined through the air-starting check valve opening, and the deposit scraped off if possible. If too hard or too extensive an accumulation is found, the head is pulled out and the surfaces thoroughly cleaned. Following this procedure, we have some cylinder heads on our blowing engines that have not been out for over 18 months. Previous to August, 1913, when new piston rods were installed in the two power engines, practically every cylinder on the two engines had been closed up for more than a year, although examined through the starting-valve opening at shorter intervals.

We have an advantage over engines with exhaust valves directly in the bottom of the cylinder in that the oil and dirt that accumulate here do not interfere in any way with the operation of the valve, but can be blown out through the drain valve, with which each end of each cylinder is equipped. These valves are held open for two full cycles every 3 hours.

Our experience indicates that with our type of engine we can operate from 12 to 18 months without removing heads for cleaning, the smaller particles of dirt being removed at lesser intervals, and also that the cleaning is necessary principally from the fact that oil is present. The portions free from oil are covered so evenly that the presence of the deposit is an advantage.

Table III shows clearly the economy of firing boilers with cleaned gas. Using dirty gas, the efficiency was 50.48 per cent, and with clean gas it increased to 59.05 per cent. The tests were run on boilers of the same make, type, and rating. It will be observed that the boilers working on clean gas developed but very little more than the builder's rating, although working at a higher efficiency than those on unwashed gas. This is due to an insufficient gas supply, which is directly traceable to undersized mains and connections, the mains

TABLE I.—STANDARD FORM FOR GAS-WASHER TEST. CARNEGIE STEEL CO., DUQUESNE FURNACES GAS-CLEANING PLANT.

Item	Description		Tower Washer Number 4
	General.		
1	Date of test	.....	7|19|1913
2	Duration of test	Hrs. Min.	:46
3	Type of washer	.....	Tower.
4	Inside Diameter	Ft.	12
5	Height	Ft.	76
6	Area	Sq. Ft.	113.1
	Temperatures.		
7	Temperature of gas entering washer	F.	475.0
8	Temperature of gas leaving washer	F.	81.4
9	Temperature of water entering washer	F.	74.0
10	Temperature of water leaving washer	F.	112.4
	Pressures.		
11	Pressure in system before washer	Ins. Water	9.0
12	Pressure in system after washer	Ins. Water	5.0
	Quantities.		
13	Water consumed per minute in washer	Gallons	875.0
14	Volume of gas passing through washer per minute at 62° F. and 30 in. Hg.	Cu. Ft.	22,800.0
15	Weight of dust per cubic foot of dry gas at 62° F. and 30 in. Hg., entering washer.	Grains	2.6517
16	Weight of dust per cubic foot of dry gas at 62° F. and 30 in. Hg., leaving washer.	Grains	0.2257
17	Moisture per cubic foot dry gas at 62° F. and 30 in. Hg., entering washer.	Grains	38.4042
18	Moisture per cubic foot dry gas at 62° F. and 30 in. Hg., leaving washer.	Grains	11.7004
19	Moisture per cubic foot of gas at observed conditions, leaving washer.	Grains	10.2862
20	Moisture per cubic foot of gas, saturated at observed conditions, leaving washer.	Grains	11.4154
	Economic Performance.		
21	Volume of gas passing through washer per sq. ft. of area, at 62° F. and 30 in. Hg.	Cu. Ft.	20.16
22	Volume of gas passing through washer per gallon of water consumed, at 62° F. and 30 in. Hg.	Cu. Ft.	20.06
23	Difference in temperature between gas entering and leaving washer	F.	392.6
24	Difference in temperature between water entering and leaving washer	F.	38.4
25	Possible depression in gas temperature	F.	401.0
26	Actual depression in gas temperature	F.	393.6
	Heat Interchange.		
27	Heat in dry gas entering washer per minute (Above 32° F.)	B. T. U.	104,418
28	Heat in water vapor entering washer per minute (Total above 32° F.)	B. T. U.	160,090
29	Heat in dust entering washer per minute (Above 32° F.)	B. T. U.	579
30	Total heat above 32° F. entering washer per minute	B. T. U.	355,087
31	Heat in dry gas leaving washer per minute (Above 32° F.)	B. T. U.	20,690
32	Heat in water vapor leaving washer per minute (Total above 32° F.)	B. T. U.	41,697
33	Heat in dust leaving washer per minute (Above 32° F.)	B. T. U.	Nil.
34	Total heat above 32° F. leaving washer per minute	B. T. U.	62,387
35	Heat transferred to water and radiated	B. T. U.	292,700
36	Heat transferred to water as shown by observed rise in temperature	B. T. U.	280,560
	Efficiencies.		
37	Efficiency of washer as dust remover	%	91.49
38	Efficiency of washer in lowering temperature of gas	%	98.15
	Gas Analysis, Gravity, etc.		
39	Carbon Dioxide, CO_2	% Vol.	12.8
40	Ethylene, C_2H_4	% Vol.	0.0
41	Oxygen, O_2	% Vol.	0.0
42	Carbon Monoxide, CO	% Vol.	25.8
43	Methane, CH_4	% Vol.	0.0
44	Hydrogen, H_2	% Vol.	4.0
45	Nitrogen, N_2	% Vol.	57.4
46	Weight per cubic foot dry gas at 62° F. and 30 in. Hg	Pounds	0.07651
47	Specific gravity referred to air	.....	1.0033
48	Calorific value of gas per cubic foot, gross, at 62° F. and 30 in. Hg	B. T. U.	96.7
49	Calorific value of gas per cubic foot, net, at 62° F. and 30 in. Hg	B. T. U.	94.7
	Moisture and Dust Determination.		
50	Gas sampled at	.....	After Washer
51	Volume of gas metered	Cu. Ft.	12.923
52	Temperature of gas at meter	F.	82.7
53	Pressure of gas in meter	Ins. Water	.....
54	Barometer reading	Ins. Hg.	29.18
55	Weight of dust as sampled	Grams	0.1708
56	Weight of moisture as sampled	Grams	8.2044
57	Dry gas factor at meter temperature	%	0.963
	Volume of Gas.		
58	Reading taken at	.....	.....
59	Temperature of gas in main	.....	81.4
60	Velocity pressure, Pitot Tube	Ins. Water	.....
61	Pressure gas in main	Ins. Water	5.0
62	Barometer reading	Ins. Hg.	29.18
63	Dry gas factor at main conditions of temperature	F.	0.963
64	Area of main at point where Pitometer is used	Sq. Ft.	.....
65	Velocity of gas per minute at point of measurement	Ft.	.....
66	Volume of gas per minute at main conditions	Cu. Ft.	.....
	Miscellany.		
67	Pumps, power requirements, average for test	K. W. H.	.....
68	Washer, power requirements, average for test	K. W. H.	.....
69	Cost of power per kw-hr	Cents	.....
70	Cost of water per 1,000 gallons	Cents	.....
71	Water pressure required for washers	Lb. per sq. in.	45 to 50

TABLE II.—Resume of Dust Tests Run with Brown Apparatus

Date of Test	Cu. ft. Gas Metered	Tempt. Gas at Meter	Tempt. Gas at Main	Barometer	Press. Gas in Main	Duration of Test	Dust as Weighed	Dust per cu. ft. Dry Gas at 62° F. and 30 in. Hg	Point at Which Sample was Taken
		° F.	° F.	In. Hg.	In. Water	Minutes	Grams		
7/16/13	9.962	76.50	82.20	29.40	8.00	30.0	0.0995	0.166	After Scrubber
7/17/13	22.843	83.80	80.30	29.17	9.00	105.0	0.3440	0.259	
7/18/13	8.590	84.70	86.10	29.18	8.00	30.5	0.0910	0.183	
7/18/13	9.537	87.00	87.00	29.18	7.00	35.5	0.1122	0.204	
7/19/13	9.135	80.60	80.40	29.18	6.00	32.0	0.0845	0.209	
7/19/13	12.923	82.70	81.40	29.18	6.00	43.0	0.1545	0.205	
7/21/13	3.867	80.00	79.30	29.30	7.00	15.0	0.0725	0.317	
7/22/13	5.055	88.70	81.40	29.40	6.00	21.0	0.0780	0.289	
7/22/13	6.620	86.50	81.00	29.37	6.00	23.5	0.0903	0.248	
7/31/13	7.205	93.00	86.00	29.30	5.00	25.0	0.0678	0.160	
Average								0.224	
7/23/13	4.524	75.40	85.50	29.28	6.00	21.00	0.0635	0.235	Before Fan
7/24/13	6.776	78.00	97.40	29.20	7.00	26.0	0.0980	0.244	
7/24/13	5.098	77.00	102.00	29.20	6.00	18.5	0.0555	0.183	
7/26/13	2.180	77.00	83.60	29.37	5.50	11.25	0.0305	0.234	
Average	.....	.....	.....	.....	.....	.....	.....	0.224	
7/28/13	6.114	90.00	86.25	29.39	10.00	18.0	0.0240	0.066	After Fan Separator
7/29/13	9.049	87.10	89.70	29.39	12.00	29.0	0.0305	0.058	
7/29/13	4.370	93.00	89.00	29.38	12.00	11.5	0.0215	0.087	
7/30/13	10.986	88.40	89.10	29.34	10.00	39.0	0.0425	0.067	
Average	.....	.....	.....	.....	....	....	.....	0.0695	

having been so designed as to take care of only 1,500 boiler horsepower of boilers on clean gas. In this case, however, the operation of approximately 3,750 boiler horsepower was attempted, resulting in a gas shortage for each of the respective units.

The above tests were also run under normal conditions and are therefore representative of working performance. It has been our experience recently that steam can be raised very quickly on washed gas, and we have put such boilers on the line at 140 to 150 pounds gage from feed water at 70 degrees, in 30 to 45 minutes. Due to very uniform gas pressures, the boilers on washed gas steam very regularly.

An Unusual Trade Catalog

The Graham Nut Co., Pittsburgh, manufacturer of nuts, bolts, rivets, washers, coach screws, etc., recently has issued a new catalog containing 106 pages. It is bound in a handsomely embossed, limp leather cover and is printed in two colors. Memoranda pages for contract data are interleaved with the catalog pages and the convenience afforded by this ready reference will be appreciated by all purchasers of the products made by this company. Illustrations show clearly all of the various products manufactured and complete data are included covering sizes, prices, etc. This catalog will prove a valuable addition to the library of every manufacturer using these products.

A new industry, known as the Rutland Foundry & Machine Co., is being established at Rutland, Vt. A site has been secured and a building, 40 x 100 feet, is to be erected.

Cold Gas for Regenerative Furnaces

A gas producer plant for furnishing cold gas for regenerative furnaces will be installed in the plant of the National Lamp Works of the General Electric Co., Cleveland, by the Smith Gas Power Co., Lexington, O. It is believed that this plant will be one of the first of its kind in this country that will employ cold gas for furnaces of the regenerative type. The plant will consist of three three-section producers, which will furnish clean, high-pressure gas for low temperature annealing lehrs and high temperature regenerative furnaces. Cold gas will give higher plant efficiency than hot gas for this class of work.

Ontario Magnetite Ore Deposits

Recently there has been offered to the iron interests a proposition which on the face of it appears to be exceedingly interesting. It relates to a reported deposit of magnetite in Ontario near Sunridge, north of Parry Sound. The deposit is included in an area recently acquired by certain Pennsylvania interests. It has been test-pitted to some extent and about a year ago some drills were used in the exploration of the property. The owners now come forward with a claimed tonnage of 100,000,000 tons and submit several assays to indicate that the ore will run 60 per cent in iron. It has long been known that there were deposits of magnetite in that locality, some of which have been considered of commercial importance, but none of the information which has been made public up to this time indicated any figures within a long range of these claims. The property has been examined several times within the past few months by representatives of large iron ore users and recently it has been reported that a Pittsburgh company had made an offer for the property after a preliminary examination. The deposit is near one railroad and could be easily transported to a deep water harbor on Georgian Bay and thus become available for distribution at lower lake ports. It will be interesting to watch the verification of the claims in regard to this property and particularly in view of the fact that, if it is of large magnitude, it will be a factor in supplying the American and Canadian market and will have some advantage in a shortened lake transportation haul over any of the deposits in the Lake Superior country.

TABLE III.—Extracts from Boiler Tests

	Observations		Fuel—Unwashed Blast-Furnace Gas	Fuel—Washed Blast-Furnace Gas
1	Number of tests	.....	16	15
2	Average duration of tests	Hrs., Min.	6:53	7:12
3	Water-heating surface	# Sq. Ft.	2,790	2,790
4	Steam pressure, gauge	Sq. In.	129.1	121.8
5	Draft	Ins. W.	0.6956	0.8226
6	Temperature of stack gases	°F.	649.3	652.8
7	Temperature of fuel gas	°F.	376.3	101.7
8	Calorific value of gas per cu. ft. at 32° F. and 30 in. Hg	B.t.u.	113.07	106.86
9	Calorific value of gas per cu. ft. at 32° F. and 30 in. Hg	B.t.u.	104.34	96.44
10	Quality of steam, corrected	Per cent.	97.01	97.32
11	Equivalent evaporation per 1,000 cu. ft. gas	Lb.	59.14	61.93
12	Equivalent evaporation per sq. ft. heating surface	Lb.	3.880	3.254
13	Equivalent evaporation per 1,000 B.t.u.	Lb.	0.5297	0.6190
14	Fuel gas at 32° F and 30 in. Hg. per developed H.P.	Cu. Ft.	613.7	572.3
15	Builders' rating	B.H.P.	250	250
16	Horse-power developed	B H.P.	313.83	234.16
17	Per cent. of rated capacity developed	Per cent.	125.53	105.60
18	Heat lost due to incomplete combustion	Per cent.	7.28	7.20
19	Heat lost due in waste gases	Per cent.	27.92	27.44
20	Heat lost due radiation and unaccounted for	Per cent.	14.32	6.31
21	Efficiency (heat absorbed by water)	Per cent.	50.48	59.05

Item No. 8 calculated from analysis; Item No. 9 as per calorimeter.

Study Men as Well as Machinery

Said a rapid fire speaker, W. S. Goodwin, to Newark Foundrymen's Association

The study of the individual and the methods to be followed in increasing his value to the industry in which he is engaged, was the subject of an address by Walt. S. Goodwin, Brooklyn, N. Y., before the members of the Newark Foundrymen's Association, Newark, N. J., on March 4. Mr. Goodwin proved a very interesting speaker and his remarks were received with marked enthusiasm. His talk was of the rapid-fire, epigrammatic variety, and he illustrated it by diagrams on the blackboard, stopping every little while to answer a question put by one of his hearers.

"I do not claim to be an efficiency engineer—not that I wish to decry that profession," said Mr. Goodwin. "I am a teacher of the spirit of efficiency and my purpose is to teach employers how to handle men. The great obstacle in efficiency work today is that efficiency men cannot swing the workmen. The reason for this is that they study the product rather than the man who produces it. The man is the thing that counts and if you can swing him, you can do anything with your product.

"To teach a man how to handle men is one of the most difficult tasks any man can set himself. Some people say this is a matter of experience, but experience, I find, is the poorest teacher under the sun of the ability to handle men. My work in 10 years has shown me that men having 25 years' experience in the handling of men do not know the first thing about handling men. The average factory foreman, in fact, does not know as much about the handling of men as the average salesman. The reason for this is that he studies only the machinery for making the product. He does not study his men. He does not have to, for, under most conditions, he does not have to compete, like the salesman, with the men he meets. The salesman has to compete with men and has to outgeneral them or starve.

"The way to learn to handle men, therefore, is to study men, and, above all, to study yourself. If you are having difficulty in handling your men, do not blame it on them and let it go at that, but locate the cause. Most probably you will find yourself to blame. Maybe you play favorites, maybe you are a bully, maybe you are too good or too easy on the men. Study the men and study yourself and you will discover how to handle them —how to get the most value possible out of them. Of course, it does not pay to 'suit' your employes; that leads to dismal failure. Rather, they must be treated in a way that they think suits them. The factory manager must always be the boss. He must not hesitate to take on a man who, although a good workman, is hard to handle. It is up to you to study him and learn how to handle him. In that way he strengthens his moral fiber, for there is nothing more weakening to a man than trying to avoid men that are hard to handle. You will find that there are few triumphs that are more gratifying than the realization that you have learned how to handle one of these 'bad actors' that abound in factories.

The Question of Tact

An important thing for the factory manager or foreman to learn is that stage setting can become a highly effective aid in the handling of men. By staging an innovation in a certain way the men can be won over to it, whereas if it were introduced in the ordinary manner, it might meet with violent opposition. In other words, it is largely a matter of tact.

"And if you haven't tact, you can acquire it. In fact, having acquired tact after a struggle, you will be a much stronger man and a more forcible one than the man who is naturally tactful. I want to add, too, that tact is essential to any kind of business success. Persistence also is essential. For instance, if you run up against a man that is hard to 'get', and keep after him and finally win him, it will be just as hard or harder for someone else to get him away from you."

Mr. Goodwin took up various types of men whose faults decrease their value to their employers. These include the indifferent man, the fussy, nervous man, the man who knows it all, the man who sticks so close to his own particular work that he can see nothing outside of it, the conceited man, the egotist and others. He told how negative qualities in men can be replaced by their positives.

"Study the man," he said, "and see what the cause of his fault is and you may be able to find a remedy. Do not call attention to his fault nor threaten to fire him; call attention to the positive quality you wish to develop in him and aid and stimulate him to develop it." Mr. Goodwin said it is of great importance to develop a positive personality.

"Personality," he said, "is the outward magnetic manifestation of an inner life. You can't consistently show on the exterior, qualities that are not in you. Get the positive qualities in you and you will radiate a positive personality—you will radiate the spirit of efficiency. Don't be negative! The negative man is he who freezes you when he looks at you. People do not like to go to him. His negative attitude repels."

Mr. Goodwin said an employer should expect much from his men.

"Give your men just a little more responsibility than they can handle with ease. Expect a lot from them and they will make good," he said. "I do not believe in discharging men. In most cases, they can be made efficient if you handle them right. It is a good thing to shift a man to another department, if he is not doing well in his present job. Maybe he will make good in the new job."

Regarding errors in business, the speaker said: "There are two kinds of errors: Errors of omission and errors of commission. The latter are easy to check, but the former are not. It is hard to check up what a man does not do that his talents would enable him to do. The biggest 'rat-holes' in a man's business, in most cases, may be summed up in the question, 'What are you not doing that you should do and could do?'"

Mr. Goodwin said that a man of 40 or 45 years of age may develop himself faster in many cases than a younger man, because the older man is more earnest. Even if he does not develop greatly, he at least does not go backward. He said every man is naturally lazy and it requires a constant struggle to overcome this fault. A man must not give in to this feeling, however, he said, because if he gives in once, he find it much easier the next time to succumb to the temptation to take a rest.

Two new members were elected at the meeting. They are the Essex Foundry, Newark, and the Henry R. Worthington plant of the International Steam Pump Co., Harrison, N. J.

The next meeting of the Newark Foundrymen's Association will be held on April 1. The speaker on that occasion will be J. S. Hibbs, of the J. W. Paxson Co., Philadelphia, who will speak on "General Foundry Practice".

Wolf Smiled as Collapse Came

Remarkable scenes in a Washington room as charges against Steel Corporation utterly fail

Washington, March 10.—Serenely smiling under a verbal lash that would have crushed the average man, David Lamar, "Wolf of Wall Street", not only received the sharp rebuke of Commissioner Harlan, of the Interstate Commerce Commission, last week before adjournment "until further notice" of the fictitious case against the United States Steel Corporation, but with a fine graciousness, actually thanked the commissioner for his "courtesies". That the commissioneer was extremely tolerant with those pressing the case goes without saying. A less judicial mind would have given away long before Mr. Harlan showed signs of irritation. Yet, in the face of such a severe reprimand, a more sensitive individual than Lamar would have indeed found it difficult to thank one who had flayed him, no matter what his position may have been.

Just that, though, is one of the many necessary keys to the enigmatic Lamar constitution. One studies him with conflicting thoughts crossing one's mind, and finally gives up in despair of ever classifying the species. Dissect and analyze as one will, there seems to be always further need of exploration, mental cutting and attempted classification of the Lamar mind. A thousand and one ideas and labels occur to one, only to be either brushed aside entirely or gravely doubted as to their correctness.

The fabric is so complex and peculiar that it is concluded the subject is for a trained student of character. One such who is seeking material need not go to the fields of fiction or theory. Lamar is a living subject, which, if given an accurate analytical sketch, would by far outdo the strangeness of any conceivable fiction.

Thoughts of insincerity of purpose, selfish and sinister motives and amazing nerve race back and forth through one's mind in trying to place this composite rara avis.

Hungry for Publicity.

Then one has another impression, which it is felt at least approaches a solution. And this impression is that Lamar is possessed of an obsession for publicity, apparently indifferent to whether it be favorable or unfavorable. The mania seems to have seized him and must be gratified at any cost. When he first appeared before the Senate lobby investigation committee last summer, Lamar generally gained credit for one thing, if for nothing else. He was declared to be extremely shrewd. But as one watches him, listens to his extravagant and ingenious stories, the quality of shrewdness is stripped from him, and it is even doubtful, it would seem, whether his activities deserve the dignity of being called cunning. The almost hypnotic influence, though, that he seems to have over others—and the Senate of the United States is not included in the category, although it passed the resolution inspired by Lamar—would indicate that he must anyhow have a modicum of cunning.

When William H. Green, Creighton, Neb., who, with Lamar, gave "evidence" at the hearing before Commissioner Harlan as to alleged rebates accepted by the Steel Corporation, he appeared as a bird charmed by the eye of a reptile as Lamar stood pompously before Green firing questions at the witness, who had been brought near to the state of collapse under kindly but firm examination by the commissioner.

Green's Plight

Green, considered generally as a man of integrity, but misguided judgment, was a meek appearing, pitiable object as he sat on the stand trying to answer the questions by Mr. Harlan, some of them repeated often with insistence for answer, in an earnest effort to bring out facts, hard, cold actualities, such as a practical, busy body like the commission deals in exclusively.

Green would shift from one position to another, ramble on with generalities, pause, evade, ascribe his source of "information" to others whom he sought to have called, and constantly parried by referring to extraneous matters. But Commissioner Harlan would have none of it. Bringing the witness to an abrupt halt, he would want to know just what information Green had, what his knowledge of transportation problems was, what were some of the rates included in tariffs of Steel Corporation rail subsidiaries which, it was claimed, had paid rebates to the parent organizations; when the "preferences" were paid, how much they were what there was to substantiate the allegation of such payments, just how the rebates were paid, whether through dividends, or how, and numberless other points. Hopelessly caught in the web of things practical, Green would try to worm his way out, only to fall further into a crevice of his self-made prison. His attorney, Herman J. Schulteis, would try to extricate him, but Schulteis, a member of the Anti-Trust League, seemed to know as little about the subject as his client. Green did say something about a 96-cent ore rate when speaking of the Duluth, Iron Range & Northern railroad, but what this rate meant, from where and to where, he could not say. One almost felt like whispering to Green, at the cost of contempt, that there is a 96-cent rate from lower Lake Erie ports to the Pittsburgh district.

Despairing, Green, in a well-nigh supplicating tone, told the commissioner he did not think he "would get into such deep water". And he related that he was trying to do a public service, had paid his own way to Washington from Creighton, and was paying his own expenses. The commissioner, still coldly practical, but kindly, said those considerations did not enter into the matter, that Green of his own initiative had taken up the case, and that the "water had depth only as he (Green) made it." Green, after a long, difficult process of questioning, reluctantly said his two witnesses who would substantiate his claims were David Lamar and Henry E. Davis, former attorney of the District of Columbia. Mr. Harlan, speaking highly of Mr. Davis, said Green should not have given the impression that Mr. Davis was unwilling to give what information he had, implying reflection upon Mr. Davis' name.

Could Not Rescue

When Schulteis, given but few chances to say anything owing to Lamar's monopolizing the spotlight, could not rescue Green, the irrepressible "wolf", who gave his vocation as an operator on Wall street, took the witness in hand. Lamar was impatient with his pupil, because Green may be termed as such in view of his stating that he had become convinced by Lamar of the charges. In half

sneering, bombastic tone, Lamar, pushing back his long, black frock coat, and interchanging the position of his hands from vest armholes to trouser pockets, began strutting back and forth and chiding Green for "generalizing" and attempted to get him down to "specific" facts. Lamar was straining himself in this stellar role to make out his own case. But it was like Munchausen trying to lift himself by his scalp. Green simply did not have the "specific facts". Commissioner Harlan grew impatient, and suggested that Green be excused and Lamar take the stand. The change was made, much to the satisfaction of both the blood-sweating Green and the self-glorifying Lamar. Lamar began a long harangue of extravagant stories, and told them so glibly, the words fell so trippingly from his tongue, that while no one could give credence to the tales, it actually seemed that Lamar was inoculated with the belief that he was telling the truth. He was halted, as was Green, from time to time, only to resume another long recital of non-essentials. One of the most amusing stories he attempted to tell went on to show how the late J. P. Morgan, when planning organization of the Steel Corporation, called in the sole aid of Lamar, who, in turn, successfully advised Mr. Morgan to call in John R. Keene.

The Final Rebuke

When Commissioner Harlan had tried by long, hard efforts to get really live facts, only to find not one scintilla of unpublished material was in the possession of or could be obtained by Lamar and his proteges, part of such information being an opinion written by Mr. Harlan himself, the latter informed Lamar that the commission would conduct the inquiry in its own way and according to its own views and did not propose to place itself in Lamar's hands. The rebuke was intended, of course only for the ones pressing the case so unjustifiably. But it would seem that it ought to, if it did not, go further and admonish the Senate for allowing itself to be baited by passing the resolution, and placing the time and efforts of the commission, so extremely occupied these days, at the service of Lamar and others partly for purposes of self-exploitation through a remarkable fiasco. Even the day after Lamar was goaded, he, with Schulteis, appeared before Examiner Gerry and had the effrontery or amazing ignorance to ask if evidence could be submitted before the examiner. Again Lamar was rebuked.

But the fatuous smile, as eternal as the unnatural laugh of Victor Hugo's Gwynplaine, still played about the Lamar countenance.

Jones Protests

Washington, March 10.—Attorney Richard A. Jones Jr., appearing for the Youngstown Sheet & Tube Co., and other independent steel companies of the Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, last Friday protested before Examiner Gerry, of the Interstate Commerce Commission, against the proposal of eastern roads to increase the 70c coal rate from the Pittsburgh district to the valleys. He also contended against a spotting charge, claiming that the cost of this service is included in the rate. Mr. Jones said he had no criticism to make at this time against the decision of the commission dismissing the complaint of the independent steel interests of the valleys against the 70c rate, but added that the decision inferentially at least said the 70c rate was reasonable and just. In view of this, he asserted, he did not see how the commission could grant the proposed increase.

Sent to Argentina

Washington, March 10.—A statement has just been issued by the department of commerce showing that sales of American manufactures to Argentina during 1913 aggregated $55,000,000, and for the last fiscal year the following were included in exports to that country:

Farm implements, $6,333,333; traction and stationary engines, $1,000,000; windmills, $500,000; automobiles, $1,250,000; other cars and carriages, $3,000,000; sewing machines, $880,000; typewriters, $355,000; cash registers, $261,000, and miscellaneous machinery, $1,750,000.

Attacks Rate

Washington, March 10.—The city of Rock Hill, S. C., has filed with the Interstate Commerce Commission a complaint against the Southern railway attacking the rate of $4.40 per ton on cast iron pipe from Anniston, Ala., to Rock Hill, as unreasonable and unjust. A reasonable rate and reparation are sought.

The application of railroads to establish a rate of 75 cents per ton of 2,240 pounds on pig iron from Ironaton, Ala., to Chattanooga, Tenn., has been denied by the commissioner.

Vigorous Petitions Will Be Filed

Washington, March 10.—Short or so-called industrial rail lines, whose concurring rates have been cancelled by trunk lines in official classification territory, to be effective April 1, are preparing petitions of vigorous protest which they will file with the Interstate Commerce Commission. As has been stated in THE IRON TRADE REVIEW, representatives of subsidiaries of the United States Steel Corporation, including the Union Railroad Co., the Newburgh & South Shore Railway Co., and the Lake Terminal Railroad Co., have filed an application asking that the commission re-open the industrial railways case.

The other, or independent short lines, will also protest cancellation of the so-called free allowances, and attempt to make one distinct point, above all others, according to information thought to be entirely reliable. At least some of the independent lines, serving steel plants, as well as other industries, will aim to prove themselves common carriers, and to show that service performed for any individual industry constitutes a less rather than a greater degree of their aggregate traffic. Should such a case be made out, the commission evidently will be compelled to concede the injustice of trunk lines in cancelling concurring rates and through routes.

It is believed that these cancellations, filed by the thousands, and affecting not only all the so-called industrial railroads of the iron and steel industry, but all other roads coming under that classification, will be allowed to become operative. With the cancellations in effect, and any road or roads suffering by reason of it, establishing a clear case why it should not be deprived of concurring rates and through routes, an avenue for reparation will be open to such lines. Considerable interest centers around the question as to whether the commission will make any distinction between corporation and independently owned short lines.

Iron and steel shippers, it is apparent, will have to contribute added millions in rates, if these cancellations become effective. They will certainly have the effect of advancing all rates from points on small lines from which through rates have been in effect. It means shippers on any of the so-called industrial railways will have to pay the local of the short line to the trunk line connection plus the rate of trunk line connections from junction point to final destination. In some instances, junction points are being cancelled.

Not Encouraging

Are business prospects, says President Clarke

Until the railroads are in a position to purchase supplies more freely, not much improvement in the steel business can be expected, says President E. A. S. Clarke, of the Lackawanna Steel Co., in his annual report to the stockholders. Mr. Clarke declares that "the outlook for business in the near future is not encouraging". Orders of the Lackawanna Steel Co. at present are low and operations this year to date have been less than 50 per cent of capacity. The construction of four additional stationary open-hearth furnaces to the company's steel works has been delayed because of reduction in business.

"The average price per ton realized for the materials shipped in 1913 was $30.34, a gain of $2.62 per ton over the corresponding period for 1912," says Mr. Clarke. "In fact, your company's net income of $3,023,084 is the largest of any year in its history; and after deducting the special profit of $267,200, arising from the sale by the Lackawanna Iron & Steel Co. of its shares of stock in the Cornwall and Lebanon railroad, the remaining profits from regular operations, amounting to $2,755,883, exceeded those of your company's outstanding common stock."

The company's receipts of iron ore from its own mines and other sources in 1913 were 2,114,637 gross tons. Its works produced 986,985 gross tons of coke, 959,995 tons of pig iron and 358,471 tons of Bessemer ingots and 736,059 tons of open-hearth ingots, making a total of 1,094,530 tons of crude steel produced. Shipments were 984,921 tons and were exceeded only by one year, 1910. This tonnage was divided into 336,339 tons of standard rails; 163,887 tons of merchant steel products; 138,538 tons of structural shapes; 75,606 tons of angle bars, fittings, etc.; 62,045 tons of semi-finished steel; 57,529 tons of billets; 8,376 tons of light rails and 142,601 tons of pig iron and miscellaneous products.

The comparative income account of the company previously has been published.

Has Large Surplus

The Allis-Chalmers Mfg. Co., Milwaukee, reports surplus on Dec. 31 last of $755,124. This surplus represents the profits from the commencement of business on April 16 to Dec. 31, 1913, which are apportioned as follows: To Allis-Chalmers Mfg. Co., $716,008; Bullock Electric Mfg. Co., $39,116; total $755,124. Unfilled orders on hand Dec. 31 amounted to $3,350,000. The net current assets of the company as of Dec. 31 last, after deducting proper reserves, amounted to $13,128,196 and the current liabilities to $1,042,501, leaving the new working capital $12,085,695.

Earns Largest Profits

The fifteenth annual report of the American Radiator Co., Chicago, was issued following the annual meeting of the company's stockholders at East Orange, N. J., Mar. 4, and shows net profits for the year to have been $2,081,267, which is the largest figure ever obtained in the history of the company, and which compares with earnings of $1,696,193 in the previous year. During the year manufacturing plants were constructed at Bayonne, N. J., and at Birmingham, Ala. The plants at Kansas City, Mo., Buffalo, N. Y., and Bremen, Ind., were largely increased; distributing warehouses were constructed at St. Louis and Providence, R. I. The general balance sheet follows:

ASSETS.

	1912.	1913.
Plants, etc.	$ 9,699,359	$ 9,953,883
Additions	554,524	1,746,339
Total	$10,253,883	$11,700,223
Less deprec.	300,000	300,000
Net	$ 9,953,883	$11,400,223
Cash	2,563,677	2,793,122
Notes receivable	332,551	312,022
Accts. receiv.	2,002,272	1,778,425
Raw mate., supplies and fin. prod.	1,712,600	1,996,940
Total quick assets	$ 6,611,102	$ 6,880,511
Total assets	16,564,986	18,280,735

LIABILITIES.

	1912.	1913.
Cap. stock pfd.	$ 3,000,000	$ 3,000,000
Cap. stock, com.	6,765,000	7,441,500
Accts. and bills pay.	573,473	1,135,044
Total	$10,338,473	$11,576,544
Balance	6,226,513	6,704,190
Total quick assets	6,611,102	6,880,511
Less accts. pay.	573,473	1,135,044
Net quick assets	$ 6,037,629	$ 5,745,466
Net profits	13,009,856	15,091,123
Less div., pfd. stock	210,000	210,000
Less div., com. stock.	†1,266,000	*1,393,590
Total	$ 1,476,900	$ 1,603,590
Balance	219,293	477,677

†Cash, $651,900; stock, $615,000.
*Cash, $717,000; stock, $676,500.

Earnings Decrease

The Studebaker Corporation and subsidiary companies during the fiscal year ended Dec. 31, 1913, earned less than in 1912, the amount applicable to the $27,931,000 common stock, after payment of preferred dividends being equivalent to 3.07 per cent. This compared with 4.94 per cent earned in 1912. The report follows:

	1913.	1912.
Net earnings	$2,483,134	$3,125,870
Interest	578,721	444,527
Extraordinary charges.	131,939	368,104
Net profits	$1,772,473	$2,313,245
Prfd. dividends	916,750	916,750
Applicable to com.	$ 855,723	$1,396,495

Little Business

Is in sight says President of American Steel Foundries

In the annual report of the American Steel Foundries for the year ending Dec. 31, 1913, President R. P. Lamont, writing under date of Feb. 21, 1914, does not take a hopeful view of the business situation. He says:

"At no time during the year did all of the plants operate at full capacity. The volume of orders on hand at the beginning of the year was large, but new business steadily declined, and by the end of the year the plants were operating at less than 50 per cent of the total capacity.

"By far the larger portion of your company's business comes directly or indirectly from the railroads and their purchases at the present time are much below normal, both for new equipment and for repairs. Unless the railroads get some relief in the near future in the matter of increased freight rates, the present year will not be a good one for businesses depending upon them. Your plants and organization were never in better condition to handle a large volume of business, but there is very little business in sight at the present time. Anything that our stockholders can do toward helping to bring about a more favorable attitude toward the railroads will directly benefit your company."

The general profit and loss account for the year shows net profit from operations amounting to $1,712,345; gross sales for the year were $17,425,940; expenditures for repairs and maintenance and absorbed in manufacturing expense during the year, $1,315,859.

Feels Curtailment

The pamphlet report of the Railway Steel Springs Co. for the year ended Dec. 31, 1913, shows net earnings of $1,472,092.87, this being the result after making allowance of $250,000 for depreciation of properties and deducting the sum of $213,119,178 for repairs and renewals. The income account compares as follows:

	1913.	1912.
Gross earnings	$7,688,185	$9,041,079
Expenses	5,966,092	6,599,940
Depreciation	250,000	359,986
Net earnings	$1,472,093	$2,081,153
Interest	350,433	357,175
Net income	$1,121,660	$1,723,978
Prfd. dividends	945,000	945,000
Surplus	$ 176,660	$ 778,978
Prev. surplus	4,618,543	3,839,565
Total surplus	$4,618,543	$4,618,543
Com. dividends	270,000	.....
Final surplus	$4,525,208	$4,618,543

President F. F. Fitzpatrick, in his

remarks to stockholders, says in part:

"Throughout the early part of the year 1913 the business of this company was of the most favorable proportions, nearly all of the plants being operated to their full capacity. About the middle of the year a marked curtailment of buying by the railroads was evident, and since then your company has suffered in general with other manufacturers who rely upon this class of work for the larger portion of their business. The success of your company depends to a very great extent upon the well being of the railroads, and when their revenues will again permit them to purchase their necessary requirements, your company will be fully prepared to meet any demand for its products. The plants of your company have, as usual, been maintained in first class conditions."

Discusses Rates

In the twenty-fifth annual report of the Chicago Railway Equipment Co., recently issued, President E. B. Leigh declares the general business of the company has maintained a high level to almost the close of the year. "It is confidently believed," says Mr. Leigh, "that had the eastern railroads been granted the advance in rates asked for June last, such action on the part of the Interstate Commerce Commission would have so restored confidence in railway credit and encouraged continued railway purchases—at least to the extent necessary to have so reinforced the volume of unfinished business—as to have not only very materially increased the business done, but doubtless would have averted the present unsatisfactory condition." The general balance sheet follows:

ASSETS.

	1913.	1912.
Prop. accts.	$1,686,428	$1,726,335
Goodwill and patents.	774,895	773,042
Invent. of raw mat., sup. and fin. prod.	867,873	804,959
Invest.	19,485	19,285
Accts. rec. and cash	594,147	733,531
Deferred charges	1,789	1,759
Total	$3,944,618	$4,058,911

LIABILITIES.

	1913.	1912.
Cap. stock	$2,486,000	$2,486,000
Cur. liabilities	214,563	555,538
Reserves	828,955	803,169
Undiv. profits	415,100	214,204
Total	$3,944,618	$4,058,911

Enoch Stanford, of Philadelphia, has purchased the Hazleton, Pa., sheet mill, and it will be put into operation. People identified with the Imperial Steel Co. will be interested. Mr. Stanford was formerly connected with works in Harrisburg and Conshohocken, Pa.

Murray Shipley

Is new president of Cincinnati Metal Trades Association

The annual meeting of the Cincinnati Branch of the National Metal Trades Association was held on the evening of March 5 at the Hotel Gibson, Cincinnati. The meeting was one of the most successful in the history of that organization, and was attended by a large delegation of visitors from surrounding cities. P. O. Geier, of the Cincinnati Milling Machine Co., the retiring president of the association, presided at the business meeting, at which reports from all of the retiring officers were given, chief of which was a review of the past year by J. M. Manley, assistant secretary of the organization.

Following a banquet, addresses were made by F. C. Caldwell, of H. W. Caldwell & Son Co., Chicago; W. A. Layman, of St. Louis, president of the National Metal Trades Association; W. A. Barr, of Buffalo, president of the National Founders' Association; J. W. Harrington, Worcester, Mass., of the Harrington & Richardson Arms Co., and Charles Hildreth, Worcester, Mass., secretary of the National Machine Tool Builders' Association. At the speakers' table were also, W. N. Alford, of New York, editor of the *American Machinist*, and Burton B. Tuttle, of Cincinnati, attorney for the Cincinnati Branch, National Metal Trades Association. Murray Shipley, of the Lodge & Shipley Machine Tool Co., Cincinnati, acted as toastmaster.

The following officers were elected for the ensuing year: President, Murray Shipley, of the Lodge & Shipley Machine Tool Co.; vice president, J. B. Doan, of the American Tool Works Co.; treasurer, A. H. Tuechter, of the Cincinnati Bickford Tool Co., and secretary, M. E. Lyons, of the J. H. Day Co., all of Cincinnati. The executive committee was chosen as follows: J. F. Littleford, of Littleford Bros.; J. A. LeBlond, of the R. K. LeBlond Machine Tool Co., and D. T. Williams, of the D. T. Williams Valve Co., all of Cincinnati.

Death of H. P. Hepburn

H. P. Hepburn, railroad builder and manufacturer, died March 4 at the home of his daughter, Mrs. R. K. Beach, in Cleveland. Many years ago, Mr. Hepburn was one of the owners of the Variety Iron Works Co., Cleveland. In 1893, when, as the result of the panic of that year, the Columbus Bridge Co., Columbus, O., became financially embarrassed, Mr. Hepburn was appointed receiver. At a later date, he organized the New Columbus Bridge Co., of which he was the principal owner, and conducted it until it was sold to the American Bridge Co. Mr. Hepburn built the Marion division of the Erie railroad and the Jamestown and Franklin division of the Lake Shore. He was the engineer of construction of the first ore and coal docks built at Ashtabula, O., in the early 70's. He was mayor of Ashtabula in 1876, when the breaking of a Lake Shore railroad bridge causing a train to plunge into the river resulted in the death of 50 people. Mr. Hepburn's eightieth birthday was celebrated by a spontaneous demonstration by the people of Ashtabula on Aug. 16, 1913, when Mr. Hepburn happened to be visiting in the city.

Opposed

To saloons in the vicinity of manufacturing plants

At the 236th meeting of the Philadelphia Foundrymen's Association, held at the Hotel Walton, that city, March 4, the "Back with the Saloon" movement, inaugurated by Thomas D. West, was discussed. W. H. Ridgway, of Craig Ridgway & Son Co., Coatesville, made a very impressive speech, giving some interesting examples of his own experience with men addicted to the use of liquor.

The following resolutions were unanimously adopted:

"Whereas the drinking of intoxicants by employes during working hours increases the number of accidents and is detrimental to the welfare and safebeing of the employe and detracts from his rendering efficient service,

"We, the foundrymen of Philadelphia and vicinity, in order to aid in the prevention of accidents and thereby minimize their number, hereby request the legislature of our state to enact such laws as will instruct the liquor license judges of the state of Pennsylvania and of all the respective counties in the state of Pennsylvania to refuse to issue licenses for the conducting of a saloon to be at the least not nearer than 600 feet of any manufacturing plant or foundry.

"We hereby resolve that a copy of this resolution be sent to the governor of Pennsylvania and to the members of the state legislature.

"We believe that 'safety first' should be promoted by authorizing the judges of the court of quarter sessions to refuse license to saloons nearer than 600 feet to foundries and factories having a large number of employes."

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

In New York, the machinery market continues rather sluggish. Although most machinery dealers are of the opinion that underlying conditions have improved to some extent, they report that they do not see the change on their order books. The opinion prevails that the machinery business will undergo no marked improvement until action is taken on the application of eastern railroads for an advance in freight rates. No new lists of importance have come out during the week.

In Chicago, general market conditions appear to be still unfavorable for the machine tool trade. Orders for single machines continue to be received, but large business still is in abeyance. Some makers of foundry equipment see an improvement and increase in orders.

In Pittsburgh, the machine tool market continued quiet last week, although belated mails—the result of raging storms throughout the most thickly populated sections of the country—brought out some inquiry Friday and Saturday. No great change in the situation is expected until warm weather, when, it is believed, general trade conditions will be more active. Mill extensions have helped the market for heavy equipment to a slight extent.

In Cincinnati, only two machine tool manufacturers are operating at full capacity. The others report business to be extremely dull. Orders received within the past week do not point to a betterment of conditions during March, as they have been very scattering, and generally for small lots or single tools. Both skilled and common labor is plentiful. Makers of special equipment, such as mixing and sugar machinery, are enjoying a good business. Small electrical equipment is in fair demand only, and second-hand machinery is still very unsatisfactory.

EASTERN STATES

NASHUA, N. H.—The Nashua Iron Foundry Co. began business last week; Henry Labine, general manager.

AMHERST.—Amherst citizens and the state have combined to finance the building of a steel tower on top of Mount Lincoln in Pelham. It will be 50 feet high and have four flights of stairs and a room 10 feet square at the top. The building spot is six miles east of Amherst. Arthur F. Bardwell is raising the subscription.

BOSTON. — Duval Spring Tire Co. has been incorporated to manufacture spring tires; $100,000; by E. S. Plaisted, A. L. Duval, R. B. Whitman.

BOSTON.—Murdock Reed Co. has been incorporated; metal and stone work; $10,000; by Chas. H. Taylor, Herbert E. Reed, Katherine M. Ford.

BOSTON.—The Vehicle Spring Supporter Co. has been incorporated; $50,000; by Lorenzo D. Corser, Arthur W. Woodward, Walter H. Woodward.

BOSTON.—The Holtzer-Cabot Co., electrical supply manufacturer whose plant at Brookline, Mass., was destroyed by fire, will locate here. The company will build in Jamaica Plain in the near future.

BROCTON, MASS. — Sterling Motor Co. has been incorporated; $50,000; by W. T. Marsh, G. M. Greene, R. M. Mackin.

CLINTON, MASS.—Max Machine Co. has been incorporated; $50,000; by Eugene J. McCarthy, Thomas McNamara, John H. Coughlin.

HAVERHILL, MASS. — John Owens & Co. of Lynn, Mass., whose wood and paper box factory was destroyed by fire Jan. 29, plans to move its business to this city and run it in conjunction with a box factory here.

HOPEDALE, MASS.—Milford, Mass., business men are raising $50,000 for a factory to be leased to the Hopedale Mfg. Co. Twenty per cent is already pledged. The merchants and board of trade have united their efforts in this work.

NATICK, MASS.—The Natick Building Association has leased a large cement industrial building on the Boston & Albany railroad at Washington street to the New England Pressed Steel Co., of Boston.

SPRINGFIELD.—A reconstruction of the B. & A. R. R. bridge at Springfield is contemplated soon. If the New Haven road cooperates, it may be a 4-track bridge. There is also talk of building a road 13 miles long from Windsor Locks, Ct., to Springfield, on the west shore of the Connecticut river. This would include building a bridge across the Agawam river.

WARE, MASS. — The Commercial Union Co., a $40,000 corporation, plans to change the old foundry on Eddy street into a modern machine shop. Everett J. Bouchard is president and treasurer.

WORCESTER, MASS. — Bids were closed Feb. 28 for the proposed transformer station and addition to the Worcester Electric Light Co.; station 15 x 33 feet of steel and concrete; power house 30 x 80 feet of brick, steel and concrete. A turbine will be installed, the whole to be ready for use July 1.

BRIDGEPORT, CONN. — Warner Bros. Co., maker of metal stamping machinery, is to build a 6-story brick and steel addition.

BRIDGEPORT, CONN.—The American Cyclecar Co. has been incorporated; $300,000; A. H. Trunbull, president.

NEW HAVEN, CONN.—Jeralds-Watson Co. has been incorporated to manufacture metal articles and machinery; $20,000 capital.

NEW HAVEN, CONN.—The Svirsky Metal Co. has organized and will begin business with $5,000; Louis Levin, president; Jacob Svirsky, secretary and treasurer.

WATERBURY, CONN.—The Electric Supply & Equipment Co. will remove to Hartford, Conn.

WATERBURY, CONN. — Waterbury Iron Works has been organized to begin business; $1,800; Julius L. Kipp, president and treasurer, Valentine Brehm, secretary, both of Meriden.

ALBANY. — Partridge, Clark & Kerrigan have been incorporated to make motor cars; $100,000; by E. S. Partridge, B. A. Wordeman, S. J. Wagstaff.

BROOKLYN. — Amaranth Machinery & Supply Works has been incorporated; $10,000; by Frances Witteman, 8726 Fort Hamilton avenue, Brooklyn; Jacob F. Witteman, R. W. Witteman, Brooklyn.

BUFFALO. — The American Radiator Co. plans a $25,000 addition consisting of wheel foundry and cupola to its factory, 61 Rano street.

MEDINA, N. Y.—A. L. Sweet Iron Works is to build a shop 70 x 150 feet.

NEW YORK CITY.—B. Hoersgeng & Co. has been incorporated; iron and steel articles; $10,000; by G. S. Zahn, G. A. Dugen, Bernard Hoersgeng, 237 West 107th street.

NEW YORK.—J. Waldo Smith, chief engineer, Municipal building, New York City, will call for bids about April 1 for a reinforced concrete bridge, 1,000 feet long, 40 feet wide, costing about $100,000.

OGDENSBURG, N. Y.—Bids will be taken late in March for a reinforced concrete bridge to cost about $100,000. It will have three spans 360 feet long and 50 feet wide, each approach being about 200 feet long. The Concrete Steel Engineering Co., 13-21 Park Row is engineer.

SYRACUSE, N. Y.—Quaint Art Co. has plans for a factory building to be erected at East Syracuse, Gordon A. Wright, architect.

SYRACUSE, N. Y. — John Single Paper Co. is having plans drawn for a building to be erected on West Jefferson street; Gordon A. Wright, architect.

SYRACUSE, N. Y. — The New Process Gear Corporation is now erecting a new 3-story 40 x 100-foot concrete and steel building to provide additional machinery facilities

for spur and bevel gear work. This new building is to be absolutely fireproof, with brick curtain walls and concrete floors, and will contain entirely new equipment. Among machines already ordered are 17 Gleason bevel gear generators, 14 Potter & Johnson automatic turret lathes, six Gould & Everhardt bevel gear blocking machines and two Fellows spiral gear shapers, all to serve as additions to the larger batteries of similar machines now in service in the main plant.

DU BOIS, PA.—The Du Bois shops, the main shop of the Buffalo, Rochester & Pittsburgh railroad will enlarge its power house and install additional machinery.

ERIE, PA. — The Pennsylvania Pneumatic Co. plans to erect a factory; Otto G. Hitchcock, president; H. Edsil Barr, vice president; Chas. Hagenlocher, secretary.

MONACA, PA.—The Solar Electric Co., of Chicago, has let the contract for a 50 x 100-foot manufacturing plant here to the Mecklen Bros., Rochester contractors. It is hoped to have the building ready for equipment in about four weeks.

PHILADELPHIA. — American Bar Lock Co., Twenty-sixth street and Pennsylvania avenue, has bought a site at Long Island City, N. Y., and will build a factory there.

PITTSBURGH.—Structural Tube & Steel Works is to build a plant at Greenville, Pa. Old steel rails are to be used for high carbon steel tubing and electric welded tubing.

PITTSBURGH. — Sale of $550,000 bridge bonds has been authorized for the proposed bridge over Chartier's Creek at Singler avenue and 20 smaller bridges on the improved roads over Pine creek.

PITTSBURGH.—The Ford Co., of Detroit, has filed revised plans which will add 25,000 square feet of floor space to its proposed Pittsburgh factory; estimated cost of structure, between $850,000 and $1,000,000.

SPRING CITY, PA. — The Pennsylvania Shafting Co. will manufacture Wright taper roller bearings and plans to erect a $150,000 plant adjoining its present plant.

TITUSVILLE, PA.—The report that J. T. Dillon, president of the Titusville Forge Co., will remodel the plant of the Riverside Gas Engine Co. is officially denied.

YORK, PA.—Flinchbough Mfg. Co., maker of gasoline engines, has removed to Greencastle, Pa., and will build a shop 60 x 100 feet.

BURLINGTON, N. J.—Geo. M. Heaton is estimating on plans for an addition to a steel and corrugated iron factory building at Roebling, N. J.

SOMERVILLE, N. J.—M. Lissberger of the Somerville Iron Works is reported as planning to build a plant of 100 tons daily capacity at Birmingham or Anniston, Ala., to manufacture soil pipe and fittings.

UNION, N. J.—The Elevator Supply & Repair Co., Chicago, will build a plant here which will cover nearly one block.

WEST ORANGE, N. J.—Collinson Iron Fence Co. has been incorporated; $5,000; manufacture fences; John Collinson, West Orange; Joseph Collinson, East Orange; John G. Crowell, Orange.

ELKTON, MD.—The Elkton Development Co. has been incoprorated; $15,000; by Frank K. Price, president; Harry R. Boulden, vice president; W. Sterling Evans, secretary; plans have been made for a large brick building for use as a textile mill.

CENTRAL STATES

AKRON, O.—Bids will be received until March 23 for water tube boilers, fuel economizer, etc.; address C. P. Parker; engineers, F. A. Barbour and E. G. Bradbury, Tremont building, Boston, Mass.

CANTON, O.—Auto Products Co. has been incorporated to manufacture motor car specialties; $150,000; by D. Thomas, J. F. Moul, S. Ake, M. J. Martin.

CARTHAGE, O.—The Holland Glass Co., now operating a glass factory at Urbana, has increased its capital stock from $125,000 to $250,000 and will erect a beer bottle factory here with a 275-ton capacity double tank furnace; John F. Holland, president. Building will start as soon as the weather permits.

CINCINNATI. — W. H. Harrison advises that the council committee of the Business Men's Club will report soon upon the project of building a bridge in Park avenue.

CINCINNATI, — The Western Methodist Book Concern has commissioned Samuel Hannaford & Sons, architects, of that city, to prepare plans for a six-story addition to its plant on Fourth street. The new building will have a frontage of 114 feet, and will cost about $350,000. It will probably have a framework of steel.

CINCINNATI.—The American Oxygen Co. will establish a plant in the Oakley factory colony. A site has been purchased and a building will be erected as soon as proper arrangements can be made. The company has leased office space in the Union Central Building, and will soon acquire a warehouse near the center of the city. The new plant will have a capacity of 30,000 feet of gas per day which will be placed on the market for both commercial and medical use in 200-pound drums.

CLEVELAND.—Globe Machine & Stamping Co. has increased its capital stock from $25,000 to $100,000.

CLEVELAND. — The Corcoran-Seidel Co. has been incorporated; auto parts; $25,000; by Geo. S. Case, F. W. Treadway, Wm. H. Marlatt, F. B. Bolton, Robert G. Morrison.

CLEVELAND. — Cleveland Pressed Steel Co. has been incorporated to manufacture steel products; $10,000; by Joseph Schulte, John H. Schulte, H. F. Rueter, G. F. Runeter, Edward Romke.

CONNEAUT, O.—Director of Public Service Mahaffey is investigating the matter of a central station heating plant for the city; as planned now, it includes the necessary machinery for the lighting plant for utilizing the exhaust steam.

DAYTON, O.—The Dayton Rubber Mfg. Co. has increased its capital stock from $150,000 to $1,000,000.

DAYTON, O.—Kramer Bros. Foundry Co. has purchased a 4-acre tract of land from the C. W. Raymond Co. for about $12,000. It intends to sell part of it for factory purposes and use the remainder for residences.

HAMILTON, O.—W. W. Crawford, county auditor, will open bids March 30 for bridges in Hamilton and Middleton. Plans may be obtained from F. M. Hammerle, engineer.

IRONTON, O.—The Foster Stove Works has purchased a site for its warehouse addition on Second and Mulberry streets.

MANSFIELD, O.—W. C. Hedges, president of the Mansfield Gas Light Co. says the foundation for the 700-horsepower direct turbine generator is ready and the foundation for the 100-horsepower Babcock & Wilcox boiler is being built. The plant starts operating April 1 and three 100-horsepower boilers will be added during the summer.

MASSILLON, O.—The contract for the proposed 905-foot steel viaduct connecting South Erie street and Pigeon road will be let March 30.

MIAMISBURG, O.—County commissioners have decided to build two bridges; one at Linden avenue and the other at Sycamore street.

MT. VERNON, O.—Hope Forge & Machine Co. has been incorporated; machine shop; $200,000; by D. B. Grubb, A. H. Sipe, C. N. Lorey, C. E. Conard, Howard Spitzer.

PORTSMOUTH, O.—Plans for the proposed permanent bridge across Scioto river will be ready the first of next week; A. T. B. Summerville, engineer.

PORTSMOUTH, O. — Geo. P. Johnston, general manager of the Chesapeake & Ohio railroad states that arrangements for constructing its proposed bridge across the Ohio river will be rushed.

SANDUSKY, O. — Marsh-Brightman Nut Co. has been incorporated to manufacture nuts and nut making machinery; $50,000; by E. H. Marsh, William Graefe, C. L. Mills, C. R. Melville, F. E. Brightman.

SHELBY, O.—The Burchard-Roberts-Walch Co., engineer, Swetland building, Cleveland, has been retained to report on a municipal lighting plant.

SOUTH CHARLESTON, O. — The Chase Colvin Fence Co. has been incorporated to manufacture fence; $30,000; by Chase Colvin, Pearl Cheney, Nellie Colvin, Pearle Cheney, Lawrence Raybourne.

SUGAR CREEK, O. — The Sugar Creek Light & Power Co. has been incorporated; furnishing light, heat and power; $25,000; by G. C. Sauser, W. E. Schweitzer, V. E. Halue, A. M. Mast, A. H. Syler.

TOLEDO, O.—Toledo Pipe Threading Machine Co. will build a large plant on Summit street.

TOLEDO.—The Lober Art Brass & Specialty Co. has been incorporated to manufacture and deal in specialties; $10,000; by W. H. Baertchi, M. J. Baertchi, Paul F. Bickert, Lucy Reichert, G. H. Lober.

WARREN, O.—Engineer William Wilson has estimated the cost of the proposed high level bridge at $130,000; Girard citizens urge its erection.

XENIA, O.—Stewart Grain Shocker Mfg. Co. has been incorporated; $50,000; by Arthur Gesler, H. S. Bailey, W. D, Wright, John Donaldson, F. D. Torrence.

YOUNGSTOWN, O.—The Distilled Water Ice Co. plans to erect a $100,000 artificial ice plant.

ZANESVILLE, O. — Plans are complete for the Dresden suspension bridge and bids are asked. The design calls for either steel wire or steel eye bar bids; it is to be 700 feet long with 20-foot clear roadway.

CLARKSBURG, W. VA.—Bids will be received until March 12 for a 450-foot bridge; D. D. Britt, engineer, Clarksburg.

CHARLESTON, W. VA. — The Farris Bridge Co. places the cost of the bridge the city proposes to erect across the Kanawa river at $265,500.

RAVENSWOOD, W. VA.—Citizens voted Feb. 21 to construct municipal water works and improve the electric light plant; Ira S. Bartlett, mayor; C. O. Nilsson, superintendent of the lighting plant.

EDMONTON, KY.—The Edmonton Light & Power Co. has been incorporated; $1,250; by Geo. Greenup, S. W. Free, A. B. Thompson, J. L. Dillon, W. E. Vansant, A. C. Coleman, J. P. Carver.

LOUISVILLE, KY. — Commercial Lithographing Co. has reduced its capital stock from $50,000 to $30,000.

LOUISVILLE, KY.—McGrath Automatic Brake Co. has been incorporated; $100,000.

LOUISVILLE, KY.—Falls City Mold Co.

has been incorporated; $5,000; by F. J. Krebs, C. C. Shrader, E. N. Weir.

MUHLENBERG, KY.—A company will be incorporated; $300,000; by L. L. Dunham, Shelby J. Gish, Central City, Ky.; Daniel Cauffiel, Wilmington, Del.; Hubert Meredith, Greenville, Ky.; J. H. Small, Central City, to erect a large power plant here.

FRANKFORT, IND.—The Oglesby Stove & Furnace Co. has been incorporated with a capital stock of $25,000 to manufacture stoves, ranges, furnaces, and heating apparatus. Among the incorporators are Arthur Ramey and Oscar S. Miller.

GOSHEN, IND. — Sheet Metal Specialty Co. has issued $5,000 preferred stock.

HUNTINGTON, IND. — A petition has been filed with the state board of utilities for permission to rebuild and enlarge the municipal lighting plant.

KOKOMO, IND.—The Kokomo Welding Co. has been incorporated; $1,000; by J. M. Klein, Rude Brown, W. A. Ulrich.

NEW ALBANY, IND. — The National Hame & Chain Co. has been incorporated; $100,000; by George D. Todd, George C. Norton, E. R. Burghard, Louisville.

NORTH MANCHESTER, IND.—Perkins Cement Post & Mold Mfg. Co. has been incorporated; $8,000; by Thomas J. John, James S. Peden, Wm. Perkins, et al.

NORTH MANCHESTER, IND. — A. W. Grosvenor, architect, Main and Court streets, Fort Wayne, Ind., will take bids shortly for a concrete bridge, two 100-foot spans, 16-foot roadway using 1¼-inch round iron bars for reinforcing.

RICHMOND, IND. — Robinson & Co., founders, advise that they do not plan to enlarge their plant in the immediate future. Later on some extensions may be made but nothing definite is under way at present.

TERRE HAUTE, IND.—The Fields Co. has been incorporated; machinery; $4,000; by Geo. R. Fields, Stewart Rose and Geo. O. Dix.

WABASH, IND. — The Wabash Foundry Co. has been incorporated; $50,000; by Nelson G. Hunter, James I. Robertson, Chas. H. Haas.

WORTHINGTON, IND. — The Worthington Building Association has increased its capital stock from $100,000 to $150,000.

CHICAGO.—I. Schwinn is having plans drawn by A. Alschlager Son & Co., architect, for a 6-story plant for the manufacture of auto trucks. Cost about $500,000.

CHICAGO. — The Addressograph Co., 901 West Van Buren street, maker of addressing machines, is to erect a 6-story factory 100 x 125 feet, to cost about $125,000.

CHICAGO.—Barber & Co. has been incorporated to manufacture and sell conveying and power transmission machinery and railway devices; $2,500; by David C. Everitt, R. M. Burnett and Sherman Barber, 2812 Wabash avenue.

CHICAGO.—Everett Mfg. Co. has been incorporated; $15,000; by K. W. DeGarmes, Wm. R. Everett, Evanston and E. J. Newton, Evanston.

CHICAGO. — John Ericsson, city engineer, City Hall, Chicago, has plans in progress for a brick, steel, fireproof, administration building, three stories, 87 x 160 feet and a ward building, four stories, 67 x 160 feet.

CHICAGO.—Worthman & Steinbach, 6235 South Halsted street, have drawn plans for a post office building of brick and iron, one story, 50 x 100 feet at Seventy-ninth and Lowe avenue, to cost $20,000.

CHICAGO.—The Standard Cycle Car Co. has been incorporated to manufacture automobiles, auto trucks, etc.; $50,000; by H. Hammill, Ernest Saunders and Otto G. Knecht, 9 South La Salle street.

CHICAGO.—Chicago Stoker Co. has been incorporated to manufacture stokers, coaling devices and machinery; $15,000; by S. C. Schultz, Jacob Schwartz, Harry J. Lurie, 69 West Washington street.

CHICAGO. — Sprague Canning Machinery Co. has been incorporated to manufacture machinery for the canning industry; $300,000; by Kenne H. Addington, Leland A. Babcock, Daniel G. Trench, 222 North Wabash avenue.

CHICAGO.—Chicago Pneumatic Pump Co. has been incorporated to manufacture machinery and pumps; $15,000; by E. J. Moline, M. E. Moline and Lewis Behan, 10 South La Salle street.

CHICAGO. — The Rickert Mfg. Co. has been incorporated to manufacture self locking wall receptacles, metal novelties and building specialties; $1,200; by H. J. Rickert, O. L. Beringer, A. C. Jaeger, 4964 Irving Park boulevard.

CHICAGO.—Acorn Opalite Metal Specialties Co. has been incorporated to manufacture sheet zinc, copper and brass specialties; $2,000; by Oscar Kauffer, Manuel Friedman, Morris Greenberg, 1041 North Western avenue.

DANVILLE, ILL. — Danville Refractories Co. has been incorporated to manufacture silica bricks, magnesite, chrome and clay products, $30,000; by Chas. J. Crawford, W. C. Johnson, Christ R. Leins.

ELGIN, ILL.—Contracts will be awarded about April 1 for machinery for the municipal lighting plant; C. A. Chapman, engineer.

GRAND RAPIDS, MICH. — The contract for the 3-story, 200 x 465-foot factory to be erected for the Manufacturers' Realty Co. on Godfrey avenue, has been let to Horner & Kelly.

LANSING, MICH.—Dr. Oliver H. Lau, of Detroit, has applied to the state railroad commission to issue $50,000 worth of stock in a company to be incorporated for constructing an electric line from Linden to Holly. It is planned later to extend the line to connect with the road to be built between Detroit and Owosso.

SAGINAW, MICH.—The Werner Pfleiderer Co. plans to spend about $150,000 on a 100 x 150-foot foundry, a 200 x 300-foot main factory building and a 2-story 60 x 100-foot office building. The foundry will probably be built first.

ANTIGO, WIS.—The Antigo Electric Co. will expend $10,000 for new equipment and replacements in its light and power plant, thus making it capable of caring for a load 100 per cent in excess of the present capacity. The plant was built four years ago.

BUTTERNUT, WIS.—W. J. Schultz, owner of the local electric plant, is considering the enlargement of the plant for the purpose of supplying business houses and residences with current. H. R. Wuerffel, electrical engineer, Chicago, Ill., is making plans and estimates.

HARTFORD, WIS.—At the annual meeting of the Wisconsin Dental Burr Co. it was decided to increase the capital stock from $30,000 to $50,000 and enlarge the plant by the installation of additional equipments. H. J. Bosworth, Chicago, is president and Fred Kehr, Hartford, Wis., is plant manager.

MILWAUKEE. — Wisconsin Cyclecar Co. has been incorporated; $25,000; by W. B. Christie, W. H. Schwab, Walter Farnekes.

RACINE, WIS.—The J. I. Case Plow Co., Racine, Wis., has closed a lease on a lot on North Broadway, St. Louis, on which a 4-story and basement warehouse will be built. The lot is 40 x 150 at 2608-10 North Broadway. The building will be equipped for storing and selling agricultural implements. It will have shipping platforms connecting with the Wabash railroad. The plow company is now at 511 North Second street, but has grown too large for its present quarters.

REEDSBURG, WIS. — The Valecia Condensed Milk Co., Madison, Wis., proposes to erect a plant costing $100,000 with complete equipment, at Reedsburg this year. Tentative plans call for a main building, 80 x 220 feet, of concrete, brick and steel construction, with a separate power house.

RHINELANDER, WIS.—The Rhinelander Iron Co. sustained a loss of several thousand dollars by fire in its blacksmithing department, which communicated to the office and machine shop and ruined considerable equipment. Repairs and replacements will be made at once.

WITTENBERG, WIS. — A bond issue of $30,000 was sanctioned at a special election for the purpose of constructing a waterworks and sewage disposal system. Plans are being drawn by W. G. Kirchhoffer, engineer, Madison, Wis.

RICHLAND, MO.—Richland Light & Power Co., of Richland, has been incorporated; $6,000; by W. I. Diffenderffer, J. B. Woodward and L. C. Harris.

BURLINGTON, IA.—Ingold Unit System, Cedar Rapids, Ia., is drawing plans for a grammar school of brick and reinforced concrete, two stories, 80 x 124 feet, to cost $45,000.

IOWA CITY, IA.—Proudfoot, Bird & Rawson, Hubbell building, Des Moines, Ia., will take bids in April for a gymnasium building at the University of Iowa, to cost about $300,000.

MASON CITY, IA.—Citizens will vote the latter part of the month on a $50,000 bond issue for a municipal light plant.

WAVERLY, IA.—The Clinton Bridge & Iron Co., Clinton, Ia., has taken a contract at $10,360, for two 80-foot, one 50-foot and one 40-foot steel bridges here.

SOUTHERN STATES

NORFOLK, VA.—Norfolk Wire Cloth Corporation has been incorporated; $100,000; by Franklin Holland, president, Bank street and Central avenue, Baltimore, Md.; Braden Vandeventer, secretary, Norfolk; to take over an established plant.

OLD FORT, N. C.—Contract for the 75 x 150-foot brick building for the Century Knitting Mills will be let at once; 100 knitting machines and accompanying apparatus will be installed.

SUMTER, S. C.—Sumter Hydraulics Co. has been incorporated; hydraulic machinery; $20,000; by A. China, W. M. Graham.

FERNANDINA, FLA.—Bids will be received until 10 a. m., March 18, for a plate girder draw bridge at Kingly's Cut, Amelia river; address J. W. Keen.

ABBEVILLE, LA.—Harold Raymond, of New Orleans, is drawing plans for improving the city power plant; estimated cost of improvements, $25,000.

MANSFIELD, LA.—Bids will be received until March 24 for water works and sewer system; $70,000 bonds are available; address J. W. Parsons, mayor.

DENISON, TEX. — The Texas Power & Light Co. plans to erect the Red river power plant just four miles from here; estimated cost; $450,000.

HEBER SPRINGS, ARK.—Arkansas Hydro-Electric Co. plans to spend $2,000,000 on a 10,000-horsepower hydro-electric plant. Installing the electric transmission system will

cost $80,000. The electrical equipment will include four turbines under a 90-foot head.

OKLAHOMA CITY, OKLA. — Patterson Nut Lock Co. has been incorporated; $100,000; by Mora G. Clark, B. G. Patterson, Oklahoma City; J. D. Oliger, Dallas; J. C. Ward, Wichita Falls, Tex.

TULSA, OKLA.—Flexible Trolley Co. has been incorporated; $3,000; by Jacob Gregory, W. H. Youse, R. C. Stueve.

WESTERN STATES

BEAVER CITY, NEB. — Bids will be opened Mar. 26 for constructing steel bridges through a period of one year; J. T. Nickerson, county clerk.

ESBON, KAS.—Bids will be received until March 18 for constructing a water works and electric light plant; Henrici, Kent & Lowry, Eng. Co., engineer, Reserve Bank building, Kansas City, Mo.; Boyd Chandler, city clerk.

MANHATTAN, KAS.—Bids will be received until 3 p. m., March 17, for motor and triplex or centrifugal pump of 1,000 gallons per minute capacity; floor space limited, pit 24 feet deep. O. E. Noble, city engineer.

OSKALOOSA, KAS.—L. P. Sheldon, city clerk, will take bids until March 21 for two 154-foot span steel bridges and 10 small reinforced concrete bridges.

MELSTONE, MONT. — The city council has granted a franchise to O. H. Bennett, of Spokane, for an electric light and power plant; to be submitted to popular vote.

IDAHO FALLS, IDA.—It is stated that the Chicago & Northwestern railroad will begin work this year on a line from Lander, Wyo., to this place and that the contract has been awarded to railroad contractor, C. O. McVey, Hanson, Ida.

COLFAX, WASH.—Colfax Iron Works has been incorporated; $22,000; by H. W. Chase, W. O Carley, B. Carlitch.

NEWPORT, WASH.—A. Welch is reported planning to build a $150,000 hydro-electric plant on Siltz river.

SEATTLE.—The West Wire Rope Co. has changed its name to the Kent Wire Co.

SEATTLE.—It is stated that C. H. Byers, chief engineer of the Milwaukee road will receive bids soon on bridge work on the Willapa branch through southwest Washington; estimated cost, $100,000.

SOUTH BEND, WASH.—It is stated that the Oregon-Washington Railroad & Navigation Co. will extend its Grays Harbor line 25 miles from Primo to Willapa harbor.

TACOMA, WASH.—The West Coast Wire Rope Works has been incorporated; $300,000; by J. W. Anderson and C. Jones.

KEYSTONE, CAL.—Keystone Iron Works has been incorporated; $50,000; directors, A. D. Williams, G. M. Young, A. J. Anderson, J. B. Anderson, H. L. Griswold.

MONTAGUE, CAL.—Bids will be received until March 23 for water works; Phinney & Marshall, Sacramento, Cal., engineer; address bids to A. H. McClellan.

OAKLAND, CAL.—The Santa Fe railroad will build a $20,000 warehouse at the corner of First and Alice streets.

TRADE NOTES

BROOKLYN.—John J. Kuhn, an attorney of 177 Montague street, Brooklyn, has been named as receiver for the Palmer & Singer Mfg. Co., manufacturer of automobiles, with a plant at Long Island City.

BROOKLYN. — The Supplymen's Association of the American Boiler Manufacturers' Association announces the completion of its list of boiler, tank and stack manufacturers of the United States and Canada, which is compiled in neat booklet form and contains names and addresses of something over 900 manufacturers. These books are offered to interested parties, such as tool and material manufacturers for $3 per copy by F. B. Slocum, secretary, care of the Continental Iron Works, West and Calyer streets, Brooklyn, N. Y.

CINCINNATI.—The Linde Air Products, New York, has leased a warehouse at 62 Plum street, and has temporarily abandoned the plan of erecting a factory building in that city.

CINCINNATI.—The C. & C. Electric & Mfg. Co., of Garwood, N. J., announces that the Indianapolis territory will temporarily be taken care of by its Cincinnati representative, F. A. Saylor, Sixth and Vine streets, Cincinnati.

COLUMBUS, O.—Baldwin Forging & Tool Co. has reduced its capital stock from $100,000 to $5,000.

DETROIT.—The American Blower Co. has secured the contract to furnish the blowers for the new ventilating equipment that is being installed in the Stivers High School, Dayton, O.

HARTFORD, CONN. — The Terry Steam Turbine Co. announces that it has concluded arrangements with Fraser & Chalmers, Ltd., whose head office is at 3 London Wall buildings, London, Eng., whereby its organization will handle Terry turbines in England and colonies (with exception of Canada). This arrangement does not include marine forced draft sets which are handled by Yarrow & Co., Ltd., Scotstoun, Glasgow, as heretofore.

JUNEAU, WIS. — The Juneau Automatic Carrier Co., manufacturing farm equipment, has moved into larger quarters and now shares the plant of the Juneau Motor Truck Co., which moved to Juneau from Milwaukee two years ago. The carrier concern is buying some little equipment, but its most important requirements are filled by the motor truck company's layout. O. L. Warren is president.

MANITOWOC, WIS. — The Smalley Mfg. Co. has increased its capital stock from $50,000 to $100,000 to care for its increasing business. No plans have been made for any extensions, but these are said to be in prospect. Chester F. Smalley is general manager.

NEW YORK CITY.—The Sanitation Corporation, 50 Church street, announces in the first bulletin, just issued, that it has taken over the sewage disposal interests of the T. A. Gillespie Co., the East Jersey Pipe Co. and the D'Olier sewage and apparatus work and certain successful German sewage processes, including the Riensch-Wurl Screen. The corporation will specialize in sanitary apparatus of a general character. The company states that copies of its initial and future bulletins will be sent upon request to any persons interested.

NEW YORK CITY.—The Linde Air Products Co., of New York, has recently placed a very large contract for seamless flasks or containers with the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. These cylinders are drawn from solid steel plates by a hydraulic forging process under rigid specifications of the Linde company, sample cylinders being tested to 6,500 pounds per square inch without bursting through the wall thickness is less than ¾ inch thick. Another interesting specification recently received by the Pipe Bending Co. is for 100,000 pieces of steel to be converted into automobile wheel rims for a well known car.

PITTSFIELD, MASS.—The branch of General Electric Co. in this city, is running 5,000 hands. The normal number is 6,500. This concern expects business to be better this spring and summer and is preparing for it.

TWO RIVERS, WIS. — The new rolling mill of the Standard Aluminum Co., of Two Rivers, is now in full operation. The company is now employing a total of 175 workmen, or twice as many as six months ago. Bookings are very liberal and a night force of 20 men has been put on to relieve the day operation.

WASHBURN, WIS. — The Northwestern Fuel Co. has made arrangements to change its coal dock drive from steam to electric and contracted with the Washburn Electric Light & Power Co. for 450 electrical horsepower for the operation of two 200-horsepower, one 100-horsepower and two 50-horsepower motors. The equipment is now being purchased. The dock will be ready for operation by the time of the opening of navigation.

WATERTOWN, WIS.—The committee of business men which has been campaigning for subscriptions to a $100,000 stock issue in a proposed company to establish a malleable iron plant in Watertown has abandoned the task because of lack of support.

WORCESTER, MASS. — The Wyman & Gordon Co., drop forging maker, report business getting better. It has been extremely dull with this company for a number of months.

WORCESTER, MASS. — The American Card Clothing Co. has sold out to Ashworth Bros., Inc., a $400,000 corporation with main factory in Philadelphia. R. C. Ashworth is president and Henry Ashworth is treasurer and manager. The latter is treasurer of the American Card Clothing Co. The Ashworth concern intends retaining the name of the purchased company as it is considered an asset. The Worcester business will not be removed at present.

NEW CATALOGS

FIRE BRICK. — A 36-page catalog issued by the E. J. Woodison Co., Detroit, is devoted to fire brick for foundry, steel plant, coke oven and boiler use. Various shapes are illustrated with dimensions, and tables are included which will prove of value to all users of brick and clay. The Woodison company, in addition to fire brick, is in position to furnish fire clays, fire sands, ganister, fire cement, kaolin, etc.

PIPE AND FITTINGS.—An exceedingly valuable eight-page bulletin has been issued by the National Tube Co., Pittsburgh, which contains a list of the various products made by this company. A total of 953 different items are included, which cover the entire line of pipe and pipe fittings for various service. This compilation should prove of value to engineers and purchasing agents generally, as it is unusually complete and lists practically every product required in pipe fitting work.

LOCOMOTIVE CRANES.—A handsomely illustrated, 56-page catalog, issued by the Industrial Works, Bay City, Mich., is devoted exclusively to locomotive cranes adapted for construction and railroad purposes and data are included regarding various accessories, such as clam shell buckets, lifting magnets, special cars, booms and attachments. The catalog is printed in three colors and contains a large number of illustrations of locomotive cranes in various service throughout the country. These views graphically illustrate the adaptability of these machines for various classes of work. The cranes built by this company are described in detail. A partial list of railroads, manufacturers, contractors and others using these cranes is included.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(First half delivery.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, Pittsburgh	13.90 to 14.15
Basic, Philadelphia	14.25 to 14.50
Malleable, Pittsburgh	14.15 to 14.40
Malleable, Chicago	14.25
Malleable, Philadelphia	15.25 to 15.50
No. 2 foundry, Pittsburgh	14.15 to 14.40
No. 2 foundry, Cleveland	14.00 to 14.25
No. 2 foundry, Ironton	13.50
No. 2 foundry, Chicago	14.25
No. 2X foundry, Philadelphia	14.85 to 15.25
No. 2X foundry, New York	14.75 to 15.25
No. 2X foundry, Buffalo	13.25 to 13.50
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, New York	14.50 to 14.75
No. 2 plain, Buffalo	13.00 to 13.25
No. 2 southern, Birmingham	11.00 to 11.50
No. 2 southern, Cincinnati	14.00 to 14.25
No. 2 southern, Chicago	14.85
No. 2 southern, Philadelphia	14.75 to 15.00
No. 2 southern, Cleveland	15.00 to 15.35
No. 2 southern, New York	14.75 to 15.25
No. 2 southern, St. Louis	14.50 to 15.00
Virginia, 2X, Philadelphia	15.55 to 15.80
Virginia, 2X, New York	15.85 to 16.10
Gray forge, Pittsburgh	13.65 to 13.90
Gray forge, Birmingham	10.25 to 10.75
Silveries, 5 per cent, Cleveland	17.30 to 17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.85
Silveries, Jackson county	16.00 to 16.50
Standard low phos., Phila.	21.00 to 21.25
Lebanon low phos., furnace	17.00 to 17.50
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent.	$4.40
Mesabi Bessemer, 51½ per cent.	4.15
Old range, non-Bes., 55 per cent.	3.60
Mesabi, non-Bessemer, 51½ per cent.	3.40

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent.	7 to 8c
Foreign non-Bess., 50 to 65 per cent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$1.95 to 2.00
Connellsville fur. contr.	2.00 to 2.10
Connellsville foundry	2.40 to 2.65
Connellsville fdy., contr.	2.50 to 2.75
Wise county furnace	2.00 to 2.10
Wise county foundry	2.50 to 3.10
Pocahontas furnace	2.15 to 2.40
Pocahontas foundry	2.50 to 2.75
New River, foundry	2.85 to 3.50
New River, furnace	2.50 to 2.75

FERRO-ALLOYS

Ferro-manganese, Baltimore	$39.00 to 40.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bes. billets, Pgh. and Yn.	$21.00
Open-hearth bil., Pbgh. and Yn.	21.00
Open-hearth bil., eastern mill	22.75 to 23.75
Forging billets, eastern mill	26.75 to 27.75
Forging billets, Pittsburgh	25.00 to 26.00
Wire rods, Pittsburgh	26.00 to 26.50
Bes. sheet bars, Pbgh. and Yn.	22.00
Op.-hearth sh. bars, Pbgh. & Yn.	22.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.35c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	23.00 to 24.00
Relaying rails, light, Chicago	$21.50 to 22.50
Angle bars, st. sect. Pbgh., base.	1.15c
Angle bars, st., sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.45c to 1.50c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c to 1.25c
Structural shapes, Chicago	1.43c
Structural shapes, Philadelphia	1.30c to 1.40c
Structural shapes, New York	1.36c to 1.41c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.38c to 1.43c
Tank plates, Pittsburgh	1.20c to 1.25c
Tank plates, Philadelphia	1.30c to 1.40c
Tank plates, New York	1.31c to 1.41c
Bars, soft steel, Pittsburgh	1.20c to 1.25c
Bars, soft steel, Chicago	1.38c to 1.43c
Bars, soft steel, Philadelphia	1.35c to 1.40c
Bars, soft steel, New York	1.36c to 1.41c
Shapes under 3 in., Pittsburgh	1.30c to 1.35c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, plates and shapes	80 cents

Hoops, carloads, Pittsburgh	1.30c to 1.35c
Hoops, less carloads, Pittsburgh	1.45c to 1.50c
Bands, Pittsburgh	1.20c to 1.25c
Shafting, carloads, Pbgh., disc.	63 to 65
Shaft'g, less carl'ds, Pbgh., disc	58 to 60
Bar iron, Chicago	1.20c
Bar iron, Philadelphia	1.22½ to 1.32½c
Bar iron, New York	1.25c to 1.30c
Bar iron, Cleveland	1.20c to 1.25c
Hard steel bars, Chicago	1.30c
Smooth finish'g mchy. steel, Chi.	1.68c
Cut nails, Philadelphia	1.80c to 1.90c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.95c to 2.00c
No. 28, black, Chicago	2.13c to 2.18c
No. 28, tin mill, black, Pbgh.	1.90c to 1.95c
No. 28, galvanized, Pbgh.	2.95c to 3.00c
No. 28, galvanized, Chgo.	3.13c to 3.18c
No. 28, cor. galv., Pbgh.	3.05c to 3.10c
No. 28, painted cor., Pbgh.	2.15c to 2.20c
No. 10, blue annealed, Pbgh.	1.40c to 1.45c
No. 10, blue annealed, Phila.	1.60c to 1.65c
Tin plate, 100 lb., coke, base	$3.40

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv.
Steel, ⅜ to 3 inches	79½	71
Iron, ⅜ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	71
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.60
Wire nails, retailers, Pittsburgh	1.65
Plain wire, jobbers, Pittsburgh	1.40
Plain wire, retailers, Pittsburgh	1.45
Galvanized wire, jobbers, Pbgh.	1.80
Galvanized wire, retailers, Pbgh.	1.85
Polished staples, Pbgh.	1.60
Galvanized staples, Pbgh.	2.00
Barb wire, painted, jobbers, Pbgh.	1.60
Barb wire, painted, retailers, Pbgh.	1.65
Barb wire, galv., retailers, Pbgh.	2.05
Barb wire, galv., jobbers, Pbgh.	2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

	Discount.
Carriage bolts, rolled thread, base	80 and 2½
Carriage bolts, cut thread, base.	75 and 17½
Mch. bolts, rolled, base	80 and 7½
Mch. bolts, cut, base	80 and 2½
Hot pressed nuts, rolled, base	80 and 7½
Hot pressed nuts, cut, base	80 and 2½
Lag screws, gimlet and cone pt.	80 and 20

RIVETS

Structural rivets, Pbgh.	1.60c to 1.65c
Structural rivets, Chgo.	1.78c
Boiler rivets, Pbgh.	1.70c to 1.75c
Boiler rivets, Chgo.	1.88c

SCREWS

(New York.)

Lag, gimlet and cone point	80 and 20
Coach, gimlet point	80
Standard jack	70 and 10
Mch., cut thread, flat head	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and 40 and 10
Mch., rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

WASHERS

(Iron or steel, New York.)

5/16-inch	5.90c
3/8-inch	5.00c
1/2-inch	3.90c
5/8-inch	3.70c
3/4-inch	3.60c

STEEL SHEET PILING

(New York.)

Base sizes	1.50c

CHAIN

American coil, straight link, 5/16-inch	8.10c
American coil, straight link, 1/4-inch	5.55c
American coil, straight link, 3/8-inch	4.00c
American coil, straight link, 1/2-inch	3.65c
American coil, straight link, 3/4-inch	3.40c
American coil, straight link, 7/8-inch	3.30c
American coil, straight link, 1-inch	3.20c
American coil, straight link, 1 1/4-inch	3.20c

	Discount.
Genuine German coil	70 and 10

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

3/4-inch and larger	1.35c
5/8-inch	1.40c
1/2-inch	1.55c
3/8-inch	1.65c
1/4-inch	1.95c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)

	Discount.
American carpet tacks	90 and 20 and 10
American cut tacks	90 and 20 and 10
Railroad tacks	90 and 40
Gimp tacks	90 and 20 and 10
Finishing nails	70

WIRE ROPE

Galvanized	47½ and 2½
Ivory	25 and 5

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35, plain	1.11
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39, galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch, galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch, galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Four inch, water, Chicago	$26.00
Six to 12 inches, Chicago	24.00
Larger sizes, Chicago	23.50
Six inch, water, New York	$22.00 to 23.00
Four-inch, water, Birmingham	21.50
Six inch and larger, Birmingham	19.50
Gas pipe, $1 per ton higher than water.	

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.90c
Steel bars, Philadelphia	1.80c
Steel bars, New York	1.90c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 2.00c
Shapes and plates, Philadelphia	1.80c
Shapes and plates, New York	1.95c
No. 10 blue ann. sheets, Chgo.	1.95c
No. 10 blue ann. sheets, Cleve.	2.15c
No. 10 blue ann. sheets, Cinci.	2.00c to 2.05c
No. 28 black sheets, Chgo.	2.55c
No. 28 black sheets, Cleveland.	2.60c
No. 28 black sheets, Cincinnati.	2.50c to 2.55c
No. 28 galv. sheets, Chgo.	3.60c
No. 28 galv. sheets, Cleveland.	3.60c
No. 28 galv. sheets, Cincinnati.	3.50c to 3.55c

IRON AND STEEL SCRAP

(Net tons.)

No. 1 railroad wrought, Chgo.	$ 9.00 to 9.50
No. 1 railroad wrought, Cleve.	10.00 to 10.50
No. 1 railroad wrought, Phgb.	11.00 to 11.50
No. 1 railroad wrought, Phila.	13.40 to 13.90
No. 1 railroad wrought, N. Y.	10.70 to 11.20
No. 1 railr'd wrought, B'm'gh'm	10.70 to 11.20
No. 1 railroad wrought, St. L.	9.00 to 9.50
No. 1 railroad wrought, Cinci.	8.75 to 9.25
No. 1 railroad wrought, Buffalo	10.70 to 11.20
No. 2 railroad wrought, Chgo.	8.50 to 9.00
No. 2 railroad wrought, Pbgh.	10.50 to 11.00
No. 2 railroad wrought, Phila.	12.90 to 13.40
No. 2 railroad wrought, N. Y.	10.20 to 10.70
No. 2 railroad wrought, Cleve.	10.50 to 11.00
No. 2 railroad wrought, Buffalo	10.20 to 10.70
No. 2 railroad wrought, Cinci.	8.25 to 8.75
No. 2 railroad wrought, St. L.	8.50 to 9.00
No. 2 railr'd wrought, B'm'gh'm	10.00 to 10.50
Arch bars and transoms, Chgo.	12.50 to 13.00
Arch bars and transoms, St. L.	12.00 to 12.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Kunckles, coup., and spg's, St. L.	10.00 to 10.50
Shafting, Chicago	11.50 to 12.00
Shafting, New York	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo.	12.25 to 12.75
Steel car axles, Phila.	15.00 to 15.50
Steel car axles, New York	12.50 to 13.00
Steel car axles, Cleveland	15.00 to 15.50
Steel car axles, Buffalo	15.00 to 15.50
Steel car axles, St. Louis	13.00 to 13.50
Steel car axles, Birmingham	15.00 to 15.50
Locomotive tires, Chicago	10.00 to 10.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$2.65
Buffalo	2.70
Chicago	2.85
Cleveland	2.15
Detroit	2.94
East St. Louis	1.95
Joliet	1.35
Louisville	2.15
Milwaukee	1.85
New York	2.50
Philadelphia	1.65
Richmond, Va.	2.10
Toledo	2.80
Valley furnaces	2.50

Locomotive tires, St. Louis	10.00 to 10.50
Cut forge, Chicago	8.75 to 9.25
Cut forge, Philadelphia	8.00 to 8.50
Pipes and flues, Chicago	7.00 to 7.50
Pipes and flues, Philadelphia	10.00 to 10.50
Pipes and flues, Cleveland	8.50 to 9.00
Pipes and flues, New York	7.50 to 8.00
Pipes and flues, Buffalo	7.50 to 8.00
Pipes and flues, St. Louis	7.00 to 7.50
No. 1 cast, Chicago	10.00 to 10.50
No. 1 cast, Pittsburgh	11.00 to 11.50
No. 1 cast, New Jersey points	11.00 to 11.50
No. 1 cast, Cleveland	10.75 to 11.00
No. 1 cast, Cincinnati	10.25 to 10.75
No. 1 cast, St. Louis	10.50 to 11.00
No. 1 cast, Birmingham	9.00 to 9.50
No. 1 busheling, Chicago	7.75 to 8.25
No. 1 busheling, Pittsburgh	9.25 to 9.75
No. 1 busheling, Cleveland	8.50 to 9.00
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Cincinnati	6.50 to 7.00
No. 1 busheling, St. Louis	8.00 to 8.50
No. 2 busheling, Chicago	6.00 to 6.50
No. 2 busheling, Buffalo	6.25 to 6.75
No. 1 boiler plate, cut, Chgo.	7.25 to 7.75
No. 1 boiler plate, cut, Buffalo	10.00 to 10.50
No. 1 boiler plate, cut, St. L.	6.50 to 7.00
Boiler plate, Cleveland	8.50 to 9.00
Boiler punchings, Chicago	9.75 to 10.25
Cast borings, Chicago	5.00 to 5.25
Cast borings, Pittsburgh	7.50 to 8.00
Cast borings, Philadelphia	8.25 to 8.75
Cast borings, New York	5.75 to 6.25
Cast borings, Cleveland	6.00 to 6.50
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.50 to 5.00
Machine shop turnings, Chgo.	5.00 to 5.50
Mch. shop turnings, Pbgh.	7.50 to 8.00
Machine shop turnings, Phila.	8.00 to 8.50
Machine shop turnings, N. Y.	5.75 to 6.25
Machine shop turnings, Cleve.	5.50 to 6.00
Machine shop turnings, Buffalo	5.75 to 6.25
Machine shop turnings, Cinci.	4.75 to 5.25
Machine shop turnings, St. L.	5.00 to 5.50
Malleable, agricultural, Chgo.	8.50 to 9.00
Mall., agricultural, Cleveland	9.00 to 9.50
Malleable, agricultural, St. Louis	8.00 to 8.50
Malleable, railroad, Chicago	9.75 to 10.25
Malleable, railroad, Pittsburgh	9.75 to 10.25
Malleable, railroad, Philadelphia	9.00 to 9.50
Malleable, railroad, Cleveland	10.75 to 11.25
Malleable, railroad, Cincinnati	7.00 to 7.50
Malleable, railroad, St. Louis	8.50 to 9.00
Malleable, railroad, Buffalo	9.75 to 10.25
Angle bars, iron, Chgo.	12.00 to 12.50
Angle bars, iron, St. Louis	10.50 to 11.00
Angle bars, steel, Chgo.	8.75 to 9.25
Angle bars, steel, St. Louis	9.50 to 10.00
Stove plate, Chicago	9.50 to 10.00
Stove plate, Pittsburgh	8.50 to 9.00
Stove plate, Philadelphia	9.25 to 9.75
Stove plate, Cleveland	8.50 to 9.00
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	7.25 to 7.75
Stove plate, Birmingham	7.00 to 7.50
Stove plate, St. Louis	8.00 to 8.50
Stove plate, New York	7.00 to 7.50
Bundled sheet, Pittsburgh	7.50 to 8.00
Bundled sheet, Cleveland	7.50 to 8.00
Bundled sheet, Cincinnati	5.00 to 5.50
Bundled sheet, Buffalo	5.50 to 6.00
Wrought iron pil'g plates, Clev.	13.00
Grate bars, Buffalo	8.50 to 9.00
Grate bars, New York	6.25 to 6.75
No. 1 country wrght, B'm'gh'm	9.00 to 9.50
No. 2 country, wrght, B'm'gh'm	7.50 to 8.00

(Gross Tons.)

Heavy melting steel, Pittsburgh	$12.25 to 12.50
Heavy melting steel, Buffalo	10.50 to 11.00
Heavy melting steel, Chicago	10.00 to 10.50
Heavy melting steel, Cleveland	10.50 to 11.00
Heavy melting steel, Cincinnati	9.25 to 9.75
Heavy melting steel, Philadel	11.50 to 12.00
Heavy melt'g steel, N. J. points	9.00 to 9.25
Heavy melting steel, St. Louis	11.00 to 11.50
Shoveling steel, Chicago	9.00 to 9.50
Shoveling steel, St. Louis	9.00 to 9.50
Reroll'g rails, 5 ft. and ov., Pbgh.	13.50 to 14.00
Reroll. rails, 5 ft. and ov., Chgo.	11.25 to 11.75
Reroll. rails, 5 ft. and ov., Cleve.	12.00 to 12.50
Reroll. rails, 5 ft. and ov., Phil.	13.50 to 14.00
Reroll. rails, 5 ft. and ov., St. L	12.50 to 13.00
Steel rails, short, Pittsburgh	13.00 to 13.50
Steel rails, short, Chicago	10.50 to 11.00
Steel rails, short, Cleveland	13.50 to 14.00
Steel rails, short, Philadelphia	13.00 to 13.50
Steel rails, short, St. Louis	11.50 to 12.00
Iron rails, Pittsburgh	13.50 to 14.00
Iron rails, Cleveland	13.00 to 13.50
Iron rails, Cincinnati	11.00 to 11.50
Iron rails, Philadelphia	15.00 to 16.00
Iron rails, St. Louis	12.00 to 12.25
Frogs, switches, guards, Chgo.	9.75 to 10.25
Frogs, switches and g'rds, St. L.	11.50 to 12.00
Car wheels, Pittsburgh	12.75 to 13.25
Car wheels, Chicago	11.75 to 12.25
Car wheels, Birmingham	12.00 to 12.50
Car wheels, Philadelphia	13.00 to 13.50
Car wheels, Buffalo	12.00 to 12.50
Car wheels, N. J. points	12.00 to 12.50
Car wheels, St. Louis	11.25 to 11.75
Iron axles, Pittsburgh	23.00 to 23.50
Iron axles, Cincinnati	19.25 to 20.00
Iron axles, Philadelphia	22.00 to 23.00
Iron axles, Buffalo	22.50 to 23.00
Iron axles, Chicago	19.25 to 20.00
Low phosphorus steel, Buffalo	15.00 to 15.50
Low phosphorus steel, Pbgh.	15.00 to 15.50
Low phosphorus steel, Philadel.	16.00 to 16.50

MISCELLANEOUS SHOP TOOLS

	Discount.
Standard files	80 and 5
Heavy hammers, 3 to 5 lb.	80 and 10
Heavy hammers, over 5 lb.	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	13c to 15c
Wrenches, Alligator, discount	75 and 80
Wrenches, drop forged S.	50 and 10

Gray Iron
CASTINGS
UP TO 10 TONS

Our facilities are EXCEPTIONAL—a FOUNDRY 160 x 80 ft.; a GENERAL MACHINE SHOP 400 x 80 ft., in which we can turn out work up to 16 ft. in dia.; and a large PATTERN SHOP complete in every detail.

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By RICHARD MOLDENKE

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Melting Processes.
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Construction and Operation of the Open-Hearth Furnace.
The Use of Gas Producers in Malleable Foundries.
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Casting Malleable Iron.
Annealing Malleable Castings.
Characteristics of Malleable Furnaces.
Use of Pyrometer in Annealing Room.
Cost of Malleable Castings.
Index.

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The Iron Trade Review
Cleveland, Ohio

Building a Plant for All Time

(*Continued from page 509.*)

the corners and sides of the buildings; the watchman's lights are 40-watt tungsten lamps placed at various points in the buildings; the tunnel lamps are 25 watts each.

The plant was constructed under the supervision of the Arnold Co., Chicago, Ill. August A. Busch, son of the late Adolphus Busch, is president of the Busch-Sulzer Bros.-Diesel Engine Co.; James R. Harris is vice president and general manager; E. A. Faust, vice president; A. C. F. Meyer, secretary-treasurer, and Max Rotter, chief engineer. The directors include August A. Busch, James R. Harris, E. A. Faust, A. C. F. Meyer, Walker Hill, Daniel N. Kirby, Robert Sulzer and Colonel E. D. Meier.

Future of the Electric Furnace

Some interesting predictions regarding the future of the electric furnace are contained in a paper read by Wilfred Sykes at the seventh annual convention of the Association of Iron and Steel Electrical Engineers in New York. The author states that for sizes over one or two tons the induction type of furnace has a very low power factor on the usual frequency of 25 cycles, and it has been found necessary to use frequency changers on the larger sizes to supply the furnace with frequencies down to five cycles per second. The first cost of the induction furnace, together with the frequency changer, is considerably higher than that of the arc type. The arc type requires carbon electrodes and the life on the brick work in the roof is short due to the intense radiation from the arc. The furnace cover is usually made removable so that this disadvantage is obviated.

During the past five years the production of electric steel in the United States has shown considerable irregularity, but in Germany there has been a steady increase in the output. Comparative figures for the two countries are as follows:

Year.	United States. Tons.	Germany. Tons.
1908	55	19,500
1909	13,762	17,700
1910	52,141	26,200
1911	29,105	60,600
1912	18,309	74,200

The decrease in production in the United States during the past two years has been due to some extent to business conditions existing in the steel industry in this country, and also to the desire to find out what results could be obtained from the electric steel rails that were made in 1910.

Several years ago a quantity of rails were made in Germany from electric steel, but they have not yet been in use long enough to determine whether they are sufficiently superior to ordinary rails to warrant the additional expense. For this reason the progress in Germany has been slower than was anticipated, the output of the electric furnaces being confined mainly to high grade alloy and crucible steels. There seems to be little doubt that in time electric furnaces will supersede crucible methods in the production of high grade steel.

Electric steel will also be used to a considerable extent in making high grade automobile castings and for other light work of similar nature. It is now an open question whether electric furnaces will be used at all for the production of rails and structural materials. If they are not, the field will be necessarily restricted to a comparatively small production. On the other hand, if it finds general use in the production of heavy finished steel, the electric furnace will become one of the most important pieces of apparatus in the modern steel mill.

Forthcoming Meetings

American Foundrymen's Association.—A. O. Backert, secretary, Penton building, Cleveland. Convention Sept. 7-10, La Salle hotel, Chicago.

American Institute of Electrical Engineers.—F. L. Hutchinson, secretary, 33 West Thirty-ninth street, New York. Next meeting at Detroit, June 23-26.

American Institute of Mining Engineers.—Bradley Stoughton, secretary; Albert Sauveur, chairman of Iron and Steel Committee, 29 West Thirty-ninth street, New York. Next meeting in fall of 1914.

American Iron and Steel Institute.—James T. McCleary, secretary, 30 Church street, New York. Next meeting, May 22 and 23, 1914, at New York.

American Society for Testing Materials.—Prof. E. Marburg, secretary, University of Pennsylvania, Philadelphia. Next meeting June 30 to July 4, at Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—C. W. Hunt, secretary, 220 West Fifty-seventh street, New York. Regular meetings at New York, first and third Wednesday of each month except June and August.

American Society of Mechanical Engineers.—Calvin W. Rice, secretary, 29 West Thirty-ninth street, New York. Next meeting June 16-19, at University of Minnesota, Minneapolis.

American Railway Engineering Association.—E. A. Fritch, secretary, 900 South Michigan avenue, Chicago. Next meeting March 17-20, at Congress hotel, Chicago.

Chicago Foundrymen's Club.—C. E. Hoyt, secretary, Lewis Institute, Chicago. Regular meetings at Sherman hotel, on second Saturday of each month.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, secretary, Oliver building, Pittsburgh. Regular meetings third Tuesday of each month.

Lake Superior Mining Institute.—A. J. Yungbluth, secretary, Ishpeming, Mich. Next meeting on Marquette range in August, 1914.

National Founders' Association.—W. H. Barr, president. Lumen Bearing Co., Buffalo; J. M. Taylor, secretary, Chicago; A. E. McClintock, commissioner, Chicago. Next meeting in New York in November, 1914.

National Metal Trades Association.—J. D. Hibbard, commissioner, Chicago. Next meeting at Worcester, Mass., April 21-22.

New England Foundrymen's Association.—Fred F. Stockwell, secretary, 205 Broadway, Cambridgeport, Mass. Regular meetings second Wednesday of each month at Exchange Club, Boston.

Philadelphia Foundrymen's Association.—Howard Evans, secretary, Pier 45 North, Philadelphia. Regular meetings first Wednesday of each month at Manufacturers' Club.

Superintendents' and Foremen's Club of Cleveland.—Philip Frankel, secretary, 310 New England building, Cleveland. Regular meetings third Saturday of each month.

Western Society of Engineers.—J. H. Wardes, secretary, 1785 Monadnock building, Chicago. Regular meetings first Wednesday of each month except July and August in Monadnock building.

The great deposits of lignite underlying what is known as the Williston lignite field in North Dakota form the subject of a report by Frank A. Herald, recently issued by the United States geological survey. Several mines are in operation in this field, and one of the plants using the lignite is unique—that of the United States reclamation service—in that it burns the lignite at the mines for the generation of electricity that is conveyed over cable lines to Buford, where electrically-operated pumps are located. These pumps lift water from the Missouri river to the canals of an extensive irrigation system, which waters a large section of the Missouri river valley. The plant, including the mine, is in operation during the irrigation season only, but it furnishes the basis of an important industry. Lignite seems well adapted to this work and can be cheaply mined.

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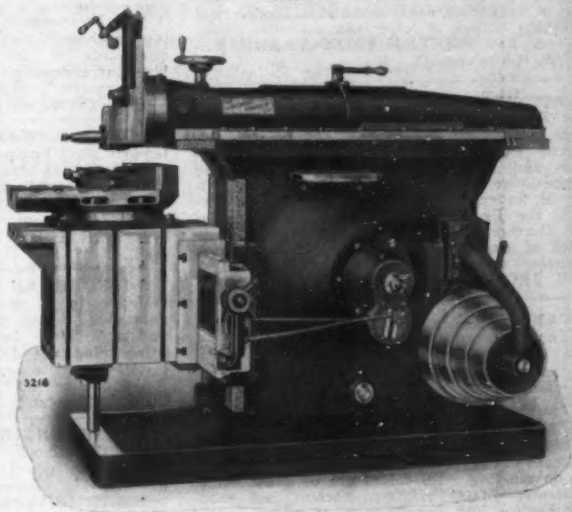

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